The
Southern Surgeon

Subscription in the United States, $4.00

Vol. VI, No. 4 Copyright 1937 by
The Southern Surgeon Publishing Co. August, 1937

IMPROVEMENTS IN THE OPERATIVE TREATMENT OF INTESTINAL CARCINOMA

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FOR the most part carcinoma of the intestine may be diagnosed with greater ease, removed with less disability, and offers greater promise of cure than that of any other internal organ. While 3 per cent occur before the age of 20, the great majority of intestinal carcinoma arise during middle life and attract attention chiefly by causing melena with constipation or, less frequently, diarrhea. The bleeding is often attributed to hemorrhoids, but the blood is less in amount, often darker, more offensive and more intimately mixed with the stool. One out of 8 of the cancers leads to an acute obstruction so that cancer is a common cause of ileus in the middle-aged and elderly.

Often the patient is ruddy and robust during the first year or two of the disease, early anemia and cachexia being rare except with cancer of the cecum.

The greater number of the cancers of the bowel are found in the rectum or lower sigmoid and may be felt by the finger in the rectum or seen through the proctoscope. For the most part the findings on palpation are diagnostic, an ulcer crater with hard, raised, everted and infiltrating borders so unmistakable in the average case that a biopsy to confirm the diagnosis is unnecessary. Unless made with care a biopsy may perforate the thinned intestinal wall.

Varieties

a. *Scirrhous carcinoma* usually occurs as a small inconspicuous, constricting growth in the narrower portions of the large bowel (the left colon), that is, from the middle of the transverse colon

From the Surgical Department of Temple University.

Read before the Eighth Annual Assembly of The Southeastern Surgical Congress, Charlotte, N. C., March 8, 9 and 10, 1937.

to the ampulla of the rectum. It produces obstructive symptoms such as constipation, distention, borborygmus, visible peristalsis, or an acute ileus.

b. *Adenocarcinoma,* a more bulky fungating, ulcerating tumor, grows in the more expanded portions of the bowel, such as the cecum, ascending colon and ampulla of the rectum, usually produces diarrhea, or less frequently obstruction. An early morning diarrhea is an almost pathognomonic symptom of cancer of the ampulla of the rectum.

c. *Papillary carcinoma* is rather rare but grows large. It occurs especially in the rectum and anus, and causes profuse, watery and mucous dejections.

d. *Colloid carcinoma* also is relatively rare and is characterized by a spindle-shaped mass, annular constriction and tendency to metastasis.

Etiology

In 60 per cent the patient is a man, usually between 45 and 60 years of age. Chronic irritation of the intestinal wall as from acid secretion, high bacterial count, adenomas, polyps, proctitis, diverticulitis, chronic constipation or diarrhea are favoring factors.

Carcinomas involving the colon above the pelvis are often palpable through the anterior abdominal wall. However, the annular scirrhous growths of the left half of the colon form a groove-like constriction of the bowel with so little mass that the growth may not be readily located even with the finger in the abdomen. For these small growths roentgen studies with the aid of a barium enema are of great value. The expert roentgenologist will rarely be deceived by constrictions in the lumen from adhesions, benign strictures, diverticulitis or regional ileitis or to pressure from without the bowel as by abscess or solid masses. It is to be remembered that cancers of the lower bowel so easy to reach and diagnose by the finger are rarely shown on the x-ray film. Cancer of the small bowel is rare and constitutes only 2 or 3 per cent of all intestinal carcinomas.

With facilities for an early and positive diagnosis so readily available it is a reproach to our profession that many of these patients are permitted to drift on for months or even years assured, by a diagnosis such as "piles," "spastic" or "atonic colon," "colitis," "adhesions," that they are free from malignant disease. Yet even though the disease has existed a year or more before the diagnosis is made, in from 40 to 60 per cent of the patients it remains possible to excise the growth. But it should be quite possible to diagnose the disease in at least 80 per cent before metastasis has occurred.

No other internal cancer is so amenable to operative cure and with early diagnosis and sufficiently radical operation, the possibility of raising the percentage of surgical five-year cures from 40 to 70 or 80 per cent is within reason.

For cancer of the intestinal tract irradiation has for the most part been very disappointing and rarely is to be advised at any time during the treatment. The evolution of the surgical treatment of carcinoma of the intestinal tract has often been circular or backward; that is, supposed advances have merely been the adoption of forgotten or discarded procedures of former days. Thus we have abandoned many of the later anastomotic operations and returned not merely to the Mikulicz procedure of 1902, but to the pre-Mikulicz procedures of Block of 1892 and Paul of 1895 for their freedom from peritoneal contamination.

Stage operations have largely supplanted the one-stage operation for most resections of the colon. Personally, I no longer find need for a permanent colostomy when it is possible to enucleate the intestinal carcinoma and for seven years have not employed it in such a case. The stage operations have been simplified and the hospitalization of patients much reduced. For carcinoma of the colon without acute obstruction the preparatory treatment is very simple and consumes but a few days. A careful physical and laboratory study is made and if the patient is dehydrated or starved, an adequate supply of fluid and soluble non-residue food, largely carbohydrate in character, is given. Heavy purgation is avoided. Repeatedly we have seen a single dose of castor oil or a heavy meal produce an acute obstruction. It is, of course, considered desirable to have the colon as free from liquid or solids as possible at the time of operation. With an intestinal obstruction, appendicostomy or cecostomy is immediately done and the radical operation delayed for two or three weeks until all peritoneal irritation has subsided. If the appendix is of fair size an appendicostomy is preferred. A 3 or 4 cm. muscle-splitting incision is made, the appendix delivered and brought out through gauze dressings. The tip of the appendix is then cut off and the largest catheter that can be introduced into the cecum is inserted and tied in. With a small buttonhole incision no stitches may be necessary and in any case the meso-appendix must not be divided or compressed. With a 20 c.c. Luer syringe, the injection and aspiration of warm saline are persisted in until the colon is decompressed. This should not annoy the patient if he is well covered and in a comfortable position in bed. Daily without disturbing the deep dressings the catheter is withdrawn and larger sizes, thoroughly lubricated, introduced. Even though the first catheter were only a 12 F. it often is possible to progress so rapidly

that at the end of a week a rectal tube size 28 is in place. If the appendix is found to be atrophic or bound down a part of the cecum is withdrawn, clamped, gauze dressings applied under the clamp, and a mushroom catheter tied in by purse-string sutures distal to the non traumatizing clamp which is then removed. As a protective antiseptic varnish we moisten the gauze dressing with the compound tincture of benzoin.

In the absence of obstruction the diseased segment of the bowel is removed at the first stage by a modification of the old operation of Paul and Block. Spinal anesthesia reinforced by the injection of the abdominal wall with 100 to 200 c.c. of 1 per cent procaine solution containing 1 minim of epinephrine to each 10 c.c. is used. For spinal anesthesia in these patients, we prefer 100 mg. of procaine in 10 per cent solution combined with 4 or 5 mg. of pontocain so that the analgesia will last two hours or longer. The local anesthetic solution supplies a bulk of fluid with the stimulant epinephrine in sufficient dilution to be slowly absorbed. Or under the brief anesthesia produced by the intravenous injection of evipal or pentothal sodium the abdomen is quickly opened and adequate splanchnic and local anesthesia produced by the free injection of a 1 per cent of procaine with 1:60,000 epinephrine. Often the patient will then doze on almost oblivious of the operation for one or two hours.

Types of Incision Employed

In resection of the cecum and ascending colon and especially the splenic flexure and lower end of the descending colon the bowel has such deep attachments that it cannot conveniently be liberated and especially exteriorized through a vertical transrectus incision. I have adopted therefore oblique incisions carried from the fascia lumborum medial and ventral to the edge of the rectus. The external oblique and in part the transversalis muscle are separated between fibers and the internal oblique divided as required. If more room is required the anterior and (above the linea semilunaris) posterior sheath of the rectus are divided and rectus and deep epigastric vessels retracted medially. The lower intercostal nerves are retracted without division. The liberated loop of colon with adjacent peritoneum, mesentery and lymphatics, is finally exteriorized through the lateral angle of the incision where it lies close to the abdominal wall.

For resection of the transverse colon or sigmoid a vertical transrectus incision serves well. After exteriorizing the cancerous loop and liberated adjacent mesentery, lymphatics and peritoneum, the opposed *antimesenteric* arms of the loop are united with fine interrupted sutures of silk and the rest of the wound closed with buried

interrupted sutures of alloy (rustless) steel wire. Dressings having been applied, the loop of bowel with attached tissue is cut away and bulbous angled glass tubes tied in the two open ends of bowel. From the glass tubes soft rubber Penrose drains lead the intestinal dis-

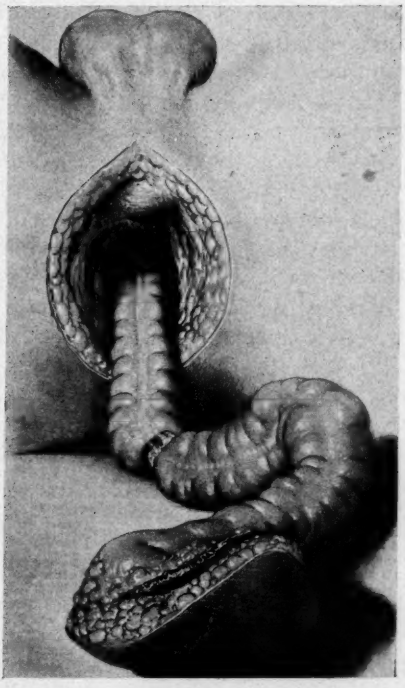

Fig. 1. Removal of pelvic floor with liberated rectosigmoid for carcinoma of the anorectal region. The rectum and sigmoid have been liberated through an abdominal incision, the inferior mesenteric and middle hemorrhoidal vessels having been ligated and divided, and a gauze tape for traction tied about the sigmoid and packed against the pelvic floor. The abdominal incision having been closed and the anus packed with iodine gauze and closed with a purse-string suture, the infiltrated pelvic floor is excised wide of the carcinoma and withdrawn with attached rectosigmoid and pelvic lymphatic tissues. It is important that well vascularized sigmoid be brought to the perineum. The perineal opening is partly closed with buried alloy steel wire sutures, dressings applied, the bowel cut away and a rectal tube tied in the protruding end of the sigmoid.

charges into rubber gloves attached to the dressing. In five to seven days the glass tubes which lie outside the abdominal wall slough out. All dressings are then removed and the abdomen, frequently cleansed, dried and dredged with zinc stearate powder, is exposed to an incandescent light under a bed cage. By the seventh to the twelfth day the spur may be divided. Without anesthetic, as

the bowel is insensitive, the redundant and sloughing ends of the bowel are trimmed and then united where apposed with two No. 35 gauge sutures of alloy steel wire tied in a surgical knot. With traction on the two sutures the spur is divided for about 1 cm. when additional wire sutures to unite the edges and control bleeding are introduced. With traction on the two deepest sutures the division and suture are continued until the spur has been divided to a sufficient depth, usually 5 to 7 cm. The bowel may then or a few days later be entirely closed with inverting interrupted sutures of No. 35 alloy steel wire. In this way the spur may be divided and the openings permanently closed in some cases as early as the twelfth day. Usually, however, after a lapse of a number of days, additional sutures are necessary with an incision to free the loops to the depth of the aponeurosis. In any case the skin and fascia should not at this early date be sutured for fear of starting a spreading pyoderma of the abdominal wall. The united bowel tends to retract within the wound and spontaneous healing by granulation commonly follows. Occasionally a carcinoma of the rectosigmoid may, after liberation to the floor of the pelvis, be delivered through the abdominal wound for an adequate excision by this method. There is, however, a danger of the distal end retracting into the pelvis unless it is securely held outside the wound by a strong clamp or other device.

For the adequate removal of most cancers of the proctosigmoid and rectum, a combined one stage abdominoperineal operation with a perineal anus has a number of advantages. Nearly all patients desire the convenience of a perineal opening. If the opening is of adequate size and care is taken to empty the colon every two to four days, soiling is largely obviated and even the absence of a sphincter ani is not such a serious matter. The discredit attached to the perineal anus has resulted from the necrosis and cicatricial stricture formation that so commonly follows the Kraske and other forms of perineal proctectomy. With viable bowel brought to the perineum which in most cases necessitates proper liberation of the upper sigmoid through an abdominal incision, an adequate anal opening may be formed. The abdominal incision also enables the exploration of the peritoneal cavity for metastasis and the more thorough removal of lymphatics and other involved tissues. If the cancerous segment is retained in the pelvis between stages, necrosis and bacterial permeation may lead to a dangerous form of sepsis before or during the later stage. It is also very important that in the liberation or delivery of the bowel cancerous or infected tissue be not entered.

For a carcinoma of the rectum and rectosigmoid, the superior mesenteric or the superior hemorrhoidal vessels are doubly ligated and divided; and with attached fat, lymphatic tissue and peritoneum

the sigmoid and rectum are freely liberated to the floor of the pelvis. A soft tape of folded gauze 1 meter long is tied around the sigmoid well above the growth and the ends packed against the floor of the pelvis, and the abdomen completely closed. With the anus closed by suture and covered, an incision is then made through the perineum from just behind the anus to the side of the coccyx, the gauze grasped and the liberated loop of bowel carefully eased through. After applying dressings the exteriorized bowel is cut

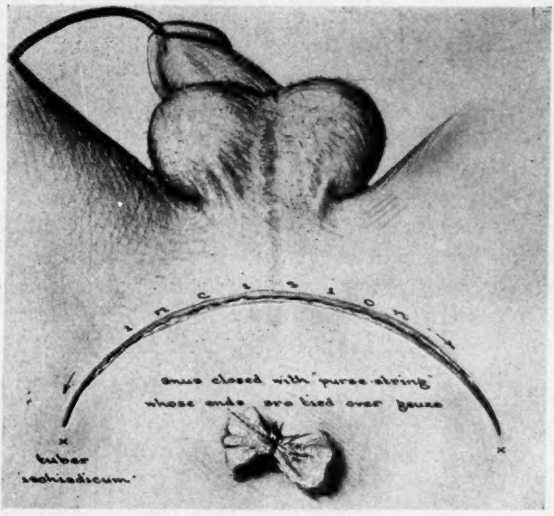

Fig. 2. Incision for delivery of carcinoma of the rectum invading the prostate. The rectosigmoid with attached lymphatics has been liberated through an abdominal incision to a point well above the level of the cancer, a gauze tape tied around the sigmoid and the abdominal incision closed. The perineal incision exposes the infiltrated prostate which is excised en masse with the liberated rectosigmoid. The loop of diseased bowel and attached soft structure is cut away between clamps and the end of the sigmoid brought out through the freely split anus. The wound is then closed with superficial and deep sutures, and a rectal tube tied in the protruding end of the sigmoid.

away and a rectal tube tied in the ends of the protruding bowel. A week or ten days later the two intervening partitions are slit through into the anus and the margins united with fine alloy wire sutures. After three or four months a very fair degree of fecal control is obtained, especially if the lower bowel is kept empty by using a small enema every 24 to 72 hours. A secondary plastic operation to improve sphincter control is therefore rarely necessary. If the lower rectum is involved by the carcinoma, the pelvic floor is removed together with the anus and attached liberated bowel and a perineal

anus formed of the sigmoid. If the prostate or other anterior structures have been invaded a curved transverse incision in front of the anus may be used for the liberation and delivery of diseased tissue which may include part of the prostate or the posterior vaginal wall. The operation is completed by pulling the end of the sigmoid through the dilated and split anal opening and the closure of the perineal incision.

For advanced ineradicable carcinoma, we find colostomy rarely desirable. By restricting the patient to a non-residue diet, by avoiding drastic cathartics, by the use of mineral oil, enemas and a resort to duodenal and rectal siphonage if obstruction develops, the necessity for the operation may usually be avoided. For the patient who is completely obstructed and at the most has only a few weeks to live it is, as a rule, better to let him die obstructed than to render him more repulsive and a greater burden to himself and friends through a colostomy. In the earlier stages when small irremovable metastases are present in the liver or lymphatics, the radical removal of the diseased bowel without colostomy is often a preferable operation. Several of our patients with hepatic involvement have lived from one to three years in relative comfort after removal of the primary tumor.

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PROBLEMS IN OSTEOMYELITIS

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IT is my purpose to discuss some of the problems encountered in treating osteomyelitis, rather than to give a dissertation on the purely scientific aspect of the disease. Most of these patients in our rural South must through necessity be treated without the benefit of many elaborate facilities available at the clinics of the teaching institutions. Many of them are unable to pay and consequently the economic problem is a serious one. They must be treated in private hospitals or in institutions with little or no endowment. As a result amputation has been done too often in an endeavor to minimize expense. It is hoped that the following suggestions will permit "in and out" treatments, which are entirely satisfactory—and the surgeon honestly desires to give such treatment—without imposing the severe burden of expense incident to prolonged stays in the hospital.

I shall discuss the embolic, traumatic and recurrent metastasizing types of the disease.

Embolic Types

These cases may be subclassified as: The acute fulminating types and those with an insidious onset.

1. The acute, fulminating type has an associated blood stream infection and positive blood cultures are frequently obtained. In these cases the problem of immediate operation confronts the surgeon, and in the past the decision has been too frequently made to operate at once. A terrific mortality rate of 50 per cent or more resulted! These patients are desperately ill and most of them showing streptococci or pneumococci on blood culture will succumb if operated on early and more than 25 per cent of those showing staphylococci on culture will not survive. They cannot withstand the added operative shock. Furthermore, little is to be gained by operating before there are localizing signs of the disease and while there are circulating organisms in the blood stream. Experience has shown the wisdom of delaying operation until the second week. The mortality rate is reduced to more than half, and those who die at this time would certainly have died if operated on earlier, as the result of the added operative shock. The time to operate is determined by the inability of the patient to withstand sustained pressure at the localizing site in the bone, and by the disappearance of circulating organisms from the blood stream. This usually occurs early in the second week.

Read before the Eighth Annual Assembly of The Southeastern Surgical Congress in Charlotte, March 8, 9 and 10, 1937.

During the acute phase—before localization occurs, the treatment should be supportive—plenty of fluids and blood transfusions.

When localization does occur an incision is made over the point of greatest tenderness. If the lesion is confined to the periosteum, this should be incised to release tension. If the process is intramedullary, a drill should be inserted through the bony cortex to release tension.

The wound should be left open and hot boric acid dressings maintained continuously. If an abscess has already formed in the soft tissues, this should be incised and drained only, for under no circumstances, with free pus in the soft tissues, should the cortex or nature's wall of defense be disturbed; to do so will extend the process, and if the lesion has already perforated into the soft tissues, one can do no more by removing the cortex than nature has already done. Following this treatment many patients are well on the road to recovery two or three weeks after the onset of the disease, and others will have entered the phase of sequestration and repair.

When the acute symptoms subside, the patient may be dismissed from the hospital to report at the office for follow-up treatment and observation. Those patients in whom sequestration occurs are readmitted to the hospital for sequestrectomy.

2. Two problems are presented in those cases with insidious onset; the diagnosis and preservation of function of the neighboring joints.

Many patients are diagnosed and treated as having arthritis. The history may be quite as suggestive of arthritis as it is of osteomyelitis. The symptoms may consist merely of soreness, slight swelling and limping, when the lower extremity is involved. Aids to diagnosis that have been of value to me are: (a) Any swelling present in a joint will be greatest in the half nearest the lesion in the bone, involving all the joint as in arthritis; (b) The greatest point of tenderness will be in the vicinity of the epiphyseal line, usually in the diaphysis and (c) sustained pressure in this area cannot be tolerated; (d) It should be the rule to make x-ray pictures in all cases where arthritis is suspected, particularly when multiple joints are not under suspicion and a Neisserian history cannot be obtained. One is often surprised at the amount of bony destruction that has taken place.

The problem after diagnosis is how to attack the pathologic changes which depend on pressure—destruction—more pressure—and more destruction. In this type early release of tension is indicated and then one should wait until sequestration and involucrum formation have occurred. This requires from six to twelve weeks.

Two operative procedures are therefore necessary; the first, a simple incision and drainage to release tension, and the second, weeks later, to remove sequestrated bone.

The problem of preserving function in the adjacent joints is solved by properly timed and adequate operation with early mobilization of the joints. Prolonged infection and prolonged immobilization result in dense fibrosis and marked limitation of motion. I use splints only until the acute inflammatory process has subsided, then permit use of the joints until sequestrectomy is done, again splinting for about ten days and then again permitting the use of the joints.

Traumatic Types

In osteomyelitis complicating compound fractures, the lesion, as in all traumatic types, is a local one, and any sequestration occurring will be in the line of fracture.

The prevention of infection is imperative. Immediate debridement, tight closure and immobilization are indicated. Should there subsequently be any evidence of infection, the wound should be reopened widely at once. Later secondary closure may be done, but not until one has secured negative cultures on three successive days. When sequestration occurs the sequestra are easily removed from the fracture line with very little surgery.

Recurrent Metastasizing Types

When we have a patient who has apparently recovered from osteomyelitis and he returns in a week complaining of redness, pain and swelling in the vicinity of a malleolus, the elbow, wrist, shoulder or mandibular joints, or with a lesion over the ribs, we are then confronted with a serious problem. We may open and drain this lesion, and about the time it heals we will likely find a similar lesion in some other part of the body. After this experience recurs and recurs, we are then convinced of the gravity of the situation.

The procedure which has given me the best results, after elimination of any focus as a factor, has been the use of transfusions from a donor immunized for the purpose against the organism obtained in pure culture from the patient. The organisms are secured by aspiration before the lesion is opened and the vaccine prepared in a competent laboratory. The dose given the donor is governed by advice from the laboratory and by experience.

I am convinced it is a mistake to incise and drain these areas. It is better to use hot applications and allow the lesions to open themselves. I obtain material for the manufacture of the vaccine just before they do open. All unnecessary trauma to the new lesion should be avoided, for I believe one lesion is the focus for the next

in the majority of cases. Autogenous and stock vaccines have not produced encouraging results in my hands. The problem appears to be the necessity for antibodies, which the patient cannot build up for himself but which can be built up by the donor.

TABULATION OF 160 CASES OF OSTEOMYELITIS

Acute	31
Insidious	60
Traumatic	62
Recurrent metastasizing	7
Sequestration ensued in	137
Acute cases healing without sequestration	16
Deaths in entire series	1
Hospital period for preliminary operation in 15 acute and 60 insidious cases	4 to 5 days
Period to sequestrectomy after operation:	
Acute cases	62 days
Insidious cases	70 days
Traumatic cases	
Gunshot wounds	48 days
Compound fracture	59 days

There were 130 cases which have healed and 29 cases not yet healed. Only one death occurred in the series. Of the 130 healed cases, 16 of the acute series healed in an average of 14 days following incision and drainage and 104 in which sequestrectomies were done healed in an average of 94 days following sequestrectomy. The 29 unhealed cases have been under observation an average of 35 days. The 7 metastasizing cases healed after an average of 2 immunized blood transfusions.

The average duration until incision and drainage in the acute cases was 8 days and in the insidious cases 37 days. The average number of days in the hospital when preliminary incision was made was 5 days in the acute cases and 4 in the insidious.

In those cases which progressed to sequestra formation, the sequestrectomy was done in the acute cases in 62 days after the preliminary incision and in the insidious cases 70 days after. The compound fracture cases had sequestrectomy after an average of 59 days and the gunshot cases 48 days after receiving the wound.

COMMENT

Experience over a number of years with this disease impresses me with certain facts: There is a definite sequence of pathologic changes. The surgeon must respect these changes and time his surgical intervention to take advantage of nature's proffered help. Respect for surgical principles is effective in overcoming this disease, more so than the use of many of the adjuncts or the

too radical surgical intervention commonly practiced in past years. The conservative treatment has been as satisfactory in civil life as in military life, and these suggestions are offered in the hope that they may prove useful and reduce the number of radical attacks and in so doing reduce the mortality rate in osteomyelitis.

Conclusions

1. In the acute, fulminating, embolic types of osteomyelitis early operation produces a high mortality.

2. Best results are obtained by operating early in the second week when the disease begins to localize.

3. In the insidious embolic types, early release of pressure is indicated. It breaks the vicious circle destroying bone.

4. Sequestration and involucrum formation require from 6 to 12 weeks: complete sequestrectomy should be done.

5. When the lesion has already perforated into the soft tissues, until involucrum formation is complete, nature's protective wall about the diseased bone should be left intact.

6. Prevention of infection is the imperative indication in trauma involving bone.

7. Transfused blood from a donor immunized against the patient's infection is a distinct aid in treating the metastasizing cases.

8. The economic factor is a serious one. Use of the methods outlined secures a considerable saving to the patient, the hospital and to the surgeon.

316-318 Professional Bldg.

SMALL BOWEL TUMORS

With Special Reference to Melena

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THERE are many diseases of protean clinical characterizations which occasionally include hematemesis as one of their manifestations, or tarry stools without other evidence of bleeding. The source of such subtle gastrointestinal hemorrhage when not revealed after a carefully taken history and complete physical examination may challenge one's diagnostic acumen.

In such instances it is advantageous to direct investigation along a well plotted course. In general, there are three chief groups of offenders: first, the acute infectious diseases with hemorrhagic tendencies—their prodromata, specific and general systemic manifestations are usually recognized; second, the blood dyscrasias with Banti's disease or splenic anemia, purpura hemorrhagica, and familial hemolytic icterus as the most common of this species—special blood studies usually reveal their nature; and third, and probably the most significant group deals with diseases primarily of the gastrointestinal tract, including carcinoma, benign strictures, ulceration, varices, and foreign bodies in the esophagus; ulcers and tumors of the stomach and small bowel; and neoplasms and infections of the colon. In this formidable group it has been estimated that a very high percentage of the gastrointestinal bleeding results from peptic ulcer and gastric carcinoma. With the markedly improved x-ray means of investigation, one may be led into the false assumption that all such lesions are easily detectable. The contrary conclusion may as often be reached.

A recent experience has again emphasized the difficulty of determining the source of gastrointestinal bleeding manifested only by dark stools and has directed attention to a reconsideration of the many factors involved. Many of the lesions in the gastrointestinal tract, particularly those of the small intestine, do not give characteristic symptoms until sequelae develop and since it is difficult to examine accurately this portion of the gastrointestinal tract, these lesions are likely to be overlooked.

It is well known that interpretation of lesions of the small intestine is much more difficult than those of other portions of the gastrointestinal tract. A variety of patterns may result not only from variations in the muscle tonus, but rearrangements of the mucous folds.

In most instances it requires from 2 to 3 hours for the barium column to reach the cecum and from 4 to 6 hours for the intestine to be entirely empty of the barium. Under control circumstances the motility of the small intestine is so gradual that most careful observation is necessary to detect peristaltic movements, segmental contractions, and changes in the mucous pattern. When these phenomena are apparent at a glance we immediately assume that there is something abnormal. No gas is ever found in the small intestine of the normal individual.

Portis and Portis, in 1923, reported a case diagnosed roentgenologically as "a probable case of tumor of the jejunum." The diagnosis was based on the following data: (1) the stomach was negative; (2) the duodenum was dilated; (3) the small bowel near the duodenum filled and remained filled, giving the appearance of a stomach with an air space above the fluid level; (4) the bowel at a point distal to the dilatation was definitely constricted; and (5) reverse peristalsis was observed in the dilated portion, proximal to the constriction. The surgeon, at operation, found an annular growth in the jejunum, near the ileum, for which resection and lateral anastomosis were done. Since this report roentgen ray diagnosis has become more accurate and the citation of a case no longer occasions surprise.

A recent case of a benign tumor is reported here with mention of the malignant tumors and a hasty review of 55 cases of carcinoma previously reviewed by C. W. Mayo and one of us (Rankin), as a timely consideration for differential diagnostic purpose. The 55 cases of carcinoma of the small intestine occurred during a period in which 4,597 cases of carcinoma of the large bowel and rectum together, and 4,335 cases of carcinoma of the stomach were observed at the Mayo Clinic. There were 37 males and 18 females of an average age of 47.5 years. The duration of symptoms varied from two months to five years with an average of 14 to 15 months. The history obviously is comparatively short with the symptoms referable to the bowel and attributable in most instances to varying degrees of obstruction.

The onset of cramps, distention, borborygmus and other manifestations of obstruction may be insidious or sudden, with a tendency, however, for the attacks to become more frequent and more severe. Occasionally, particularly with lesions in the duodenum and higher jejunum, the symptoms may simulate the dyspepsias characteristic either of gallbladder disease or peptic ulcer. In time there is an appreciable anemia which often can be detected if repeated stool examinations are made for occult blood. Unfortunately, these

lesions metastasize early, in order of frequency, to the mesenteric glands, peritoneum, liver, lungs, and bowel. In the cases in which diagnosis was assumed to be early, one out of three showed extension of the growth beyond its local confines. This unfavorable circumstance adequately accounts for the poor prognosis, with the average life expectancy of one year, and the longest of three years.

Of the 35 benign neoplasms of the small intestine reported by Newell and one of us (Rankin), there were 11 adenomas, 11 myomas, 6 fibromas, 2 lipomas, 2 hemangiomas, one of which had ulcerated and given rise to severe gastrointestinal hemorrhage, 1 cyst, 1 adenomyoma, and 1 osteochondroma. In 17 cases of this series the tumors were found incidentally in the course of intra-abdominal operations. In the remaining 18 cases the symptoms were referable to the tumor found at operation. The symptoms varied in duration from 2 months to 35 years, averaging 8 years, which differs considerably from 14 to 15 months for the malignant tumors of the small bowel. Gross hemorrhage occurred in 4 out of 18 cases.

Obstruction, due in the majority of cases to intussusception, occurred in 50 per cent of the cases. The obstructive phenomena may lack constancy in localization and prove difficult of evaluation, and doubly so if there is associated disease. This is very well exemplified by a case of Bargen's. The patient was a female 60 years of age, first seen in August, 1926, with a chief complaint of (1) a lump in the lower left quadrant, (2) colicky pains in the right upper quadrant and "gas cramps" lasting one to three days and often radiating to the lower left quadrant, (3) associated dyspepsia, and (4) following or associated with attacks were loose stools, 6 to 12 for a few days.

Examinations including routine blood Wassermann, x-ray of chest and colon were negative. The only positive finding was obtained by proctoscopy when an extra-rectal mass was found high in the left side. At exploration on Sept. 6, 1926, the gallbladder was found filled with stones and a lesion was discovered in the sigmoid, considered to be either carcinoma or diverticulitis. A colostomy was done. Three weeks later anterior resection of the sigmoid was successfully accomplished and the tumor proved to be diverticulitis. Nov. 11, 1926, the patient had an attack of lower right quadrant pain; July 6, 1930, cholecystectomy was done for stones. This same localized pain recurred while patient was still in the hospital. Recurrent attacks caused her to return in September, 1930, during an attack of pain and vomiting. A mass or lump in the right side of the abdomen was found for the first time. The patient again yielded to surgery. A pedunculated lipoma measuring 5.5 by 2.5 cm. was

found in the ileum and was resected. The patient when last heard of had remained free of all discomfort. Bargen concluded, and rightly it seems, that the subsequent course suggested that the lipoma had caused the symptoms of the original complaint.

A recent interesting case of our own is that of a man 34 years old who first entered the hospital on March 8, 1936, for investigation and diagnosis of a complaint which had occurred at irregular intervals for three or more years. He had consulted many physicians without diagnosis or relief. In fact, the irregularity of his distress had caused the patient to be considered neurotic by some of his examiners. His story was essentially of a vague abdominal distress which he associated in a way with the ingestion of food and characterized to a degree by a feeling of weakness and general malaise coming on about one-half hour after eating. This did not occur after each meal or with any seasonal regularity. There was no pain and no qualitative food distress excepting for milk which when taken in excess of a pint caused the distress. There had been no nausea, vomiting, bowel irregularity, or alteration in the stools with previous episodes. However, 3 weeks before he was examined by us, 2 days before, and the day of examination respectively, tarry stools had been noticed. Sweating and prostration were marked at the latter time. The stools on examination were frankly tarry, erythrocytes numbered 2,570,000. Weakness was now the chief complaint; the stools continued black, and four days later the erythrocytes numbered 1,920,000 and leukocytes 11,400 in each cubic millimeter of blood. The hemoglobin was 4.5 grams. The urinalysis was negative.

On March 16, the patient received a transfusion of 600 c.c. of citrated blood and on March 20, 375 c.c. of blood. The bleeding evidently was controlled, the stools became lighter in color, weakness was overcome, temperature dropped from 100° and 102° to normal, and the pulse was reduced from 110 to 80, the beats regular and strong. The patient's general condition was greatly improved. A history of systems, a complete physical examination, and inquiry into the past and family history, were irrelevant. Examination revealed a well nourished and developed, but very pale, young man. Head and neck, chest and abdomen, showed no masses, tenderness, herniae, etc.

By March 25 it was considered safe to institute special investigations. A gastric analysis showed an absence of free hydrochloric acid, a total acidity of 43 degrees, and a trace of occult blood. Since this examination did not distress the patient or precipitate further hemorrhage, the stomach and duodenum were examined fluoroscopically after a barium meal and reported as normal. On the

night of April 1, the patient for the first time had severe right upper quadrant pain which lasted one and one-half hours and required morphine, 1/6 gr., for relief. Moderate rigidity was present and lasted until the next morning. There was no appreciable change in the temperature, pulse, respiration or blood picture. Erythrocytes numbered 3,900,000 and leukocytes 6,000. The hemoglobin was 8 grams.

Inasmuch as marked general improvement was manifested and gastro-intestinal bleeding had abated, the patient was allowed to go home since no definite source of the disturbance had been found. Seventeen days later the patient returned to the hospital for further study. Slight abdominal pain, without localization, had occurred at irregular intervals and the patient had lost strength. On April 17, erythrocytes numbered 2,800,000 and on April 27, 2,350,000 with hemoglobin registering 4.2 grams. Additional blood studies showed nothing abnormal in the erythrocytes or leukocytes other than the changes consistent with a secondary anemia. The bleeding time was 1½ minutes, the clotting time 3 minutes, the platelets numbered 320,000. The van den Bergh reaction was indirect with a normal serum bilirubin. In spite of 1000 c.c. of blood having been administered between April 27 and May 6, the erythrocyte count had only increased from 2,350,000 to 2,440,000. It was quite evident that the patient was losing blood faster than it could be supplied, and with consistently negative chemical, roentgenologic and clinical findings an exploration was advised. A preoperative opinion was held of small bowel tumor or a silent duodenal ulcer.

On May 7, under gas-ether anesthesia an upper right rectus incision was made. On exploring the abdomen the examining hand immediately encountered a large mass approximately 10 cm. in diameter lying at about the level of the umbilicus. When delivered it proved to be a segment of intussuscepted small intestine. There was some edema and injection but no impairment of the circulation or integrity of the bowel. The intussusception was easily reduced and then it was possible to feel in the proximal part of this segment a freely movable tumor approximately 3 cm. in diameter.

Because of its mobility it was impossible to tell the exact location of the tumor so in order to insure against its evasion and to safeguard against the possibility of a malignant neoplasm, a wide resection including about 16 cm. of the small intestine was done. An aseptic end-to-end anastomosis over the Rankin clamp was completed. The duodenum was somewhat thickened and was opened for inspection to eliminate this site as the source or an additional point of bleeding. It appeared normal and was closed. The gallbladder and stomach, as well as the spleen, were normal. Because the patient

was a poor risk, the small intestine was not examined throughout in a search for other tumors.

The patient received a transfusion of 500 c.c. of citrated blood immediately after operation. His convalescence was uneventful, the stools became normal in color within a week and he was dismissed from the hospital on the fourteenth postoperative day. He has been seen repeatedly at 2 to 3 week intervals and now, 12 months later, he continues free from his previous vague discomfort, has gained 20 pounds in weight, and his erythrocyte count remains constantly above 4,000,000.

The pathologic report was as follows: The gross specimen consists of a segment measuring 13 cm. in length removed from the jejunum. A pedunculated polyp measuring 2 cm. in diameter is attached to the mucosa. No ulceration is apparent. Histopathology: sections show an adenomatous polyp with no changes suggesting malignancy. A small amount of inflammation is apparent.

Diagnosis: Chronic inflammation in adenomatous polyp of the jejunum.

Discussion

When first seen this patient was in moderate shock, was sweating abnormally, was noticeably pale, with an elevated pulse rate. The tarry stools and reduced erythrocyte count were sufficient evidence of gastrointestinal hemorrhage. There was no history or familial background for hemorrhagic diathesis. The blood picture was not that of blood dyscrasia, and there were no petechiae, glandular enlargement, or palpable abdominal viscera.

The history in no way was characteristic of a lesion of the esophagus, cirrhosis of the liver, or gallbladder disease. The distress was of the vaguest kind and bore no relation to the usual classic picture of peptic ulcer, but this possibility was kept ever in mind with the knowledge and experience that approximately 90 per cent of gastrointestinal bleeding has this origin. The negative roentgen study of the stomach and duodenum did not entirely dispel this factor since it is well known that symptomless ulcers may bleed and may not reveal themselves roentgenologically. More by a process of elimination did we come to consider a small bowel tumor. Roentgen studies had failed and obstructive phenomena had not occurred to arouse suspicion of intussusception and small bowel tumor, unless one might so interpret the one episode of right upper quadrant pain which lasted for one and one-half hours.

When all common causes of gastrointestinal bleeding have been eliminated serious consideration must be given to small bowel tumors as the causative factors. Of the series of 35 cases of benign tumor

of the small intestine previously mentioned, 18 gave symptoms referable to the tumor and of this latter number, gross hemorrhage occurred in 4 cases. The tumor in each instance was in the duodenum. The resulting hemorrhage in these 4 cases was gastric in one, intestinal in one, and both gastric and intestinal in two. In the additional case we report the hemorrhage was strictly intestinal and the lesion was found in the jejunum. The blood loss was marked and over a short period of time. The patient received multiple transfusions with immediate response but within one or two days the continued blood loss several times offset the benefits of transfusion. This case exemplifies the amount of blood that may be lost from this source and likewise the imperative need for surgical exploration in the instance of repeated, exsanguinating gastrointestinal bleeding when the usual causes have been eliminated.

Treatment

The tumor may frequently be removed by a properly placed incision directed over the tumefaction, the bowel having previously been occluded on either side of the growth by rubber covered intestinal clamps to prevent contamination. Most of the tumors are pedunculated and offer no difficulty in their removal. A simple elliptical incision circumscribing the base and including an area of normal mucosa is usually adequate. The rent in the intestinal lining can then be approximated by interrupted sutures of black silk or chromic gut. The lumen of the bowel is then closed in the direction to allow for the greatest capacity of the bowel at that point. Rarely is it necessary to protect the closure by a proximally placed enterostomy. Some of the tumors will be extraluminary or submucosal and will have given rise to obstructive symptoms either by encroaching upon the lumen or by initiating hyperperistalsis and the often associated phenomena of intussusception. These tumors can often be removed without opening the lumen.

The preceding method is usually satisfactory and safe but is entirely inadequate should the lesion prove malignant. With few exceptions this lurking and imminent hazard makes it advisable to do a rather wide resection of the bowel to either side of the tumor to circumscribe any possible local extension into the bowel or adjacent mesentery.

With the introduction of a new double-bladed clamp we advocate an aseptic end-to-end anastomosis. Including the present case we have successfully used this method in 4 cases of small bowel tumor. A lateral anastomosis was done in one case and an end-to-end restoration in three. It is our belief that the latter method in most instances of small bowel tumor is the method of choice.

The steps are relatively few and easily accomplished: (1) ligation of the vessels supplying blood to the segment to be removed; (2) application of the blades of the clamp, incorporating a loop of small bowel in either blade and before application, making sure of the blood supply to either end; (3) removal of the affected segment with the cautery after applying another clamp above the Rankin clamp; (4) application of a row of sutures around the entire circumference of the bowel before withdrawal of the clamp; (5) withdrawal of the clamp and tying of sutures; (6) application of a second row of sutures around the entire circumference of the bowel; (7) closure of the mesenteric defect; and (8) breaking out the diaphragm by invaginating a finger through the anastomosis. We have never seen secondary hemorrhage, stricture, or leakage in any of our cases in which resection of the large or small bowel has been accomplished by this method. One must remain ever mindful of occasional multiple tumors and conclude the operation by a careful examination of the entire small bowel providing the patient's general condition will tolerate the additional shock of manipulating the intestine.

SUMMARY

1. The source of gastrointestinal bleeding manifested solely by tarry stools may prove difficult of detection.

2. Examinations should be directed to eliminate infectious disease with hemorrhagic tendencies, blood dyscrasias and gastrointestinal lesions.

3. Roentgenologic studies of the stomach, small intestine and colon are essential; however, a fairly large percentage of lesions of the small bowel will not be visualized.

4. Small bowel tumors may give rise to insidious bleeding or exsanguinating hemorrhage. The detailed case report substantiates this opinion.

5. When all available examinations fail to reveal the source of gastrointestinal bleeding, exploration and search for small bowel tumor is justified.

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EVALUATING THE FUNCTIONAL ELEMENT IN THE DIAGNOSIS AND TREATMENT OF SURGICAL DISEASES

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THE prevalence of functional disorders in medical and surgical practice, the frequent failure to recognize them and their improper management in many instances are the reasons for my selection of this subject this evening. It is conservatively estimated that 35 to 50 per cent of patients seen in general medical practice are seeking relief for conditions which are entirely functional in origin: Moersch[1] at the Mayo Clinic 44 per cent, Ebaugh[2] 35 per cent, Weiss[3] 35 per cent, McLester[4] 32.6 per cent in a series of gastrointestinal cases studied and Stephenson[5] 66 per cent in gastrointestinal practice.

This vast army of individuals which has no doubt increased as a result of the depression, falls into the general class of psychoneurosis which includes (a) neurasthenia (chronic nervous exhaustion), (b) the various neuroses, (c) hysteria, (d) psychasthenia and (e) hypochondriasis. While migraine is not a psychoneurosis, I think it should be mentioned here since it has no proven organic basis and its symptoms are variable and confusing enough to be frequently classified erroneously as various organic diseases.

Neurasthenia or chronic nervous exhaustion comprises by far the largest number of functional disorders and is the group which presents the greatest problem to those of us engaged in general medical and surgical practice. It is this group which largely constitutes the basis of this discussion.

I attribute the improper management of these cases partly to lack of training the medical student receives on the subject of functional disorders. The emphasis laid on organic diseases in teaching, in medical books and current literature, has led the average physician to belittle or ignore the influence of the emotional or psychic factor as a cause of physical symptoms. This has resulted in a large number of these patients being labeled with a diagnosis of organic disease and treated for a non-existent physical disorder.

The symptoms of chronic nervous exhaustion are manifold. They may appear to originate in any and all bodily structures and systems. The outstanding symptoms, however, are fatigue and weakness brought on by physical or mental exertion. These patients attribute their symptoms to physical disease, ignoring the psychic element which is entirely responsible for their predicament. They are ex-

Read before the meeting of the Jefferson County Medical Society, Birmingham, Jan. 19, 1937.

tremely sensitive to all sensory impressions, resulting in introspection, an undue interest in the state of their health and fears of existence or development of organic disease. The patient thus becomes aware of his digestion, heart action, noise in the ears, and unpleasant taste in the mouth, etc. Other outstanding symptoms include headache, sweating, polyuria, tinnitus and vertigo, tremors, and pains which may shift from one part of the body to another but more often in the occipital, cervical or interscapular or low lumbar regions. These pains are often attributed by the patients to "neuritis." Symptoms are frequently referable to the gastrointestinal tract, examples of which are sensations of fulness, gaseous distress, nausea, anorexia, air-swallowing and discomfort after eating. Enteroptosis is a frequent finding in functional disorders.

Anxiety over their physical state, failure to improve and inability to perform their duties, lead these patients into a chain of mental symptoms such as insomnia, forgetfulness, irritability, fear, lack of decision, feeling of inferiority, and an increased tendency to worry. It is characteristic of these individuals to insist on going into the minutest detail in describing their symptoms. They frequently bring in pages of notes for fear they will forget to tell the doctor all of their complaints. While sex is a factor in many neuroses, it is usually only a part of the neurotic condition.

It can be readily seen from a general outline of symptoms that functional disorders may mimic any organic disease. It therefore behooves us to make extra efforts in our clinical and laboratory investigations in order to arrive at a definite conclusion as to whether the symptoms are functional or organic in origin. The diagnosis of these disorders requires skill and insight on the part of the physician. Such a diagnosis should be made not only by exclusion but by the characteristics of the disease itself. In the investigation of neuroses frequently many laboratory and x-ray examinations must be made. Such a thorough examination serves a two-fold purpose. It satisfies the physician and many, but not all, patients that organic disease is not responsible for the complaints and it is of great therapeutic aid in that it is reassuring to the patient to know that nothing has been overlooked and that the physician has a genuine interest in his case. After excluding organic disease, psychic and emotional factors should be carefully studied. We must never lose sight of the fact that a psychoneurotic patient may also have coexistent organic disease, in which case the symptoms must be carefully weighed and the part played by each condition be accurately determined. This is at times a very difficult task.

The medical profession today treats patients with functional disorders largely in one of three ways:

(a) As organically diseased, submitting them to unnecessary medical and surgical treatment, thereby intensifying their neurosis.

(b) The patient is told that the physician is not sure there is anything wrong but that he is suspicious of some organic disease—e. g., the fatigue in his case may mean pulmonary tuberculosis.

(c) Or the patients are told there is no organic disease, that the whole thing is functional or imaginary or that they are neurotic.

I disagree with those who believe they are "missing something" when they are unable to find an organic basis for the patient's complaints and who believe that further researches will uncover hidden causes such as infection, allergy or endocrine disturbances. I thoroughly agree with the opinion expressed by McLester who stated that the majority of psychoneurotic patients are born and not made. They inherit an unstable nervous system which renders them incapable of adjusting themselves to conflicts of their environment and every day life.

It is true that organic disease may be overlooked and the patient treated for functional disease but I am convinced that the reverse is more often true.

Macy and Allen[6] in 1934 studied 235 patients who had been diagnosed as chronic nervous exhaustion at the Mayo Clinic six years previously, to see how many of them had been erroneously diagnosed. They found the diagnosis to be correct in 98 per cent of the cases, proving that the diagnosis of chronic nervous exhaustion, when made under good circumstances, is reliable in a high degree. They found the conditions most commonly confused with chronic nervous exhaustion were hyperthyroidism, chronic encephalitis and tuberculosis. Women comprised 78 per cent of this group of cases. The points of origin of the major symptoms were: gastrointestinal tract in 69 cases, nervous system 60 cases, muscular system 37 cases, thyroid gland 20 cases and heart 14 cases. It was interesting to note that 200 of the patients in their report had undergone a total of 289 separate operations. Tonsillectomies had been done on 74. Of 156 women in this series, 81 had undergone operations on pelvic organs, including hysterectomy, suspensions, plastic repairs and operations on the ovaries. Removal of the appendix, gallbladder or thyroid was done in many instances. Failure to obtain relief from these operations was largely to be expected.

Bennett and Semrod,[7] in 1936, reported a study of 100 psychoneurotic patients admitted to the University of Nebraska Hospital, which showed clearly the errors of diagnosis in such cases. Seventy-two of the 100 patients had been erroneously diagnosed as organically diseased. Twenty-nine had been diagnosed as organic disease

of the gastrointestinal tract, the gallbladder predominating. Fourteen had been diagnosed as toxic thyroid disease. Fifteen were labeled as severe cerebral disease and 11 as organic heart disease.

Seventy-three of the hundred patients had undergone 179 surgical operations many of which were no doubt unjustifiable. The authors attributed the errors of diagnosis in their series of cases to the failure of the physicians properly to appreciate and investigate the personality make up of the individual cases.

It is quite evident from the symptoms of psychoneuroses that they will simulate most frequently those surgical lesions referable to the (1) gastrointestinal tract (chronic appendicitis, chronic cholecystitis, peptic ulcer and colon lesions), (2) endocrine glands (most common being hyperthyroidism), (3) central nervous system and (4) female reproductive organs.

We must study the organism as a whole and not concentrate on one organ in arriving at correct diagnosis. The characteristic features of functional and organic diseases are so well known that after a thorough investigation of the case including personality study, there should be no great difficulty in the majority of cases in arriving at a correct diagnosis.

Laboratory examinations may sometimes be misleading in making a differential diagnosis of functional and organic disease. Frequently the first basal metabolism reading in the neurotic individual is above normal, due to emotional upset. It is necessary therefore to repeat the test before making a positive diagnosis. The Graham Cole test for gallbladder function should also be carefully interpreted and correlated with clinical findings before making a positive diagnosis of gallbladder disease. It seems to me that too much significance is attached to the persistence of the gallbladder shadow after the fat meal. I have seen many patients explored for gallbladder disease on account of the persistent shadow being interpreted as disturbed function. Such gallbladders are usually found at operation to be free of stones and to show very little abnormality otherwise. A follow-up of these cases after operation shows, as a rule, they are not relieved of their symptoms, indicating that in all probability the gallbladder was not the primary site of trouble.

So many neurotic patients have had their appendices removed that I always ask if the appendix was acute or chronic and almost invariably the answer is "chronic." This answer is usually amplified by the statement that the pain has persisted or has become worse, indicating to the patient that *adhesions* have developed.

In the differential diagnosis of upper abdominal disease, migraine should also be considered, as well as the neuroses, because of its

prevalence and because it is manifested in so many different degrees of severity. Roentgenology has been of inestimable value in differentiating peptic ulcer and gastric carcinoma from the functional disorders referable to the stomach.

A frequent gastrointestinal condition found in chronic nervous exhaustion is so-called spastic colon (mucous colitis, irritable colon) characterized by alternating constipation and diarrhea with accompanying vague abdominal discomfort. This condition is often erroneously diagnosed as organic disease of the colon or of the appendix. The female pelvis has borne more than its share of operations in vain attempts to relieve symptoms of functional origin.

We cannot afford to be too dogmatic in the practice of medicine but when we have arrived at a diagnosis of psychoneurosis we should be definite in expressing our opinion to the patient. In this way only can the best results be achieved. As for treatment the most powerful means at the physician's disposal is his ability of reassurance, his capacity for understanding, for sympathy and advice.

In closing, I do not wish to leave the impression that surgery is not indicated in the presence of functional disorders. When confronted with co-existent functional and organic disease, explain to the patients the difference between the two and do not leave the impression that repairing the lacerated perineum, cauterizing the cervix, suspending the uterus, removing the gallbladder or the appendix, is going to restore to them a stable nervous system. Of course there will be temporary relief due to the rest in bed following operation and diversions of their minds from their troubles to their operations but unfortunately the relief is not lasting. In other words, be as reasonably sure as possible that the patient will be permanently benefited from the operation.

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INEXPENSIVE "TRACTION IRONS," FOR WELL LEG COUNTER TRACTION, WITHOUT USE OF BONE PINS

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MY purpose in presenting this short paper is to offer for your consideration a simple apparatus, which I have called "Traction Irons," and which are designed, when properly incorporated in a plaster cast, to accomplish the many advantages of the widely used "well leg counter traction" without the use of "bone pins." These "irons" are particularly applicable in the treatment of fractures of the femur, including the neck, intertrochanteric, subtrochanteric regions, and especially effective in treating unilateral fractures and injuries of the pelvis. The fractures to which this apparatus is applicable are so common in the experience of those of us called on to treat automobile, industrial, and railroad accidents, and the apparatus is so simple and inexpensive to make, and so easy to use, that I feel justified in calling it to the attention of those who have such cases to treat.

It is not my intention to discuss the advantages, disadvantages or applicability of well leg counter traction. Such discussion is readily obtainable from other sources. Neither is it my intention to discuss in detail the fractures to which this method and this simple apparatus are applicable, the principle of "well leg counter traction" by more expensive and more complicated methods being also well known. Suffice it to mention the advantages of these simple "traction irons," and to describe the method of application.

ADVANTAGES OF DOZIER'S TRACTION IRON METHOD

1. The apparatus is cheap, and it is available anywhere there is a blacksmith, machine shop, or foundry. Cost per set, $3.50.

2. Its use obviates the necessity for the "Steinmann Pin," required by the Roger Anderson skeletal and well leg counter traction splint—therefore it can be used by men with limited surgical skill, experience and facilities, but who, nevertheless, have many such cases to treat. Of course it is not subject to the accidents and complications which occasionally occur where pins are used for *traction*: such as infection or osteoporosis. The old objection to the use of hardware in bone is not applicable. The patient's objection to the use of pins is also met.

3. It secures all the advantages of the principle of "well leg counter traction," with none of the disadvantages above enumerated.

4. No careful cleansing or polishing of the splint is necessary after removal of the cast—no resharpening and retempering of the

pins and no clogging with plaster of the threads, connections, and lever arms, as is the case with more expensive apparatus.

5. There will be no pain or discomfort or other trouble if the apparatus is properly applied, the pressure points are carefully padded, and the cast is properly trimmed.

6. It requires no special apparatus or fracture table and usually no anesthetic, during application, only plaster bandages and the

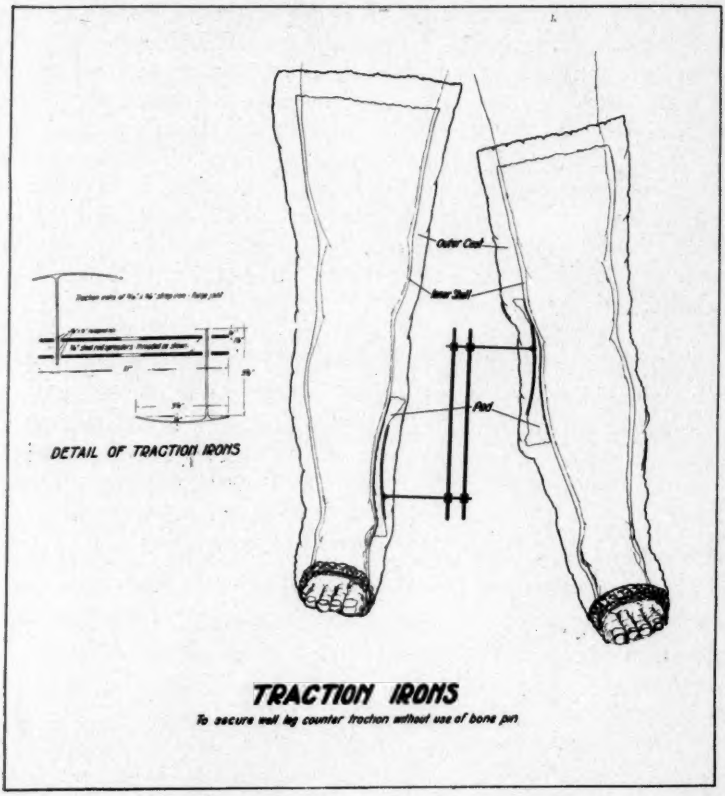

Figure 1

apparatus itself. No skilled assistants are necessary. It can be applied anywhere—on bed, floor, or table.

7. There is no wabbling of the apparatus if the lock nuts are properly tightened. The holes in the transverse bar may be spaced further apart if necessary.

8. In case of neck and intertrochanteric fractures of the femur if more abduction is desired this can be accomplished by increasing

the thickness of the plaster pad under the traction irons, or by lengthening the transverse bar of the apparatus.

Precautions

The same precautions in applying a plaster cast in treating fractures are applicable here. It is my practice to use a Thomas Splint on the hip joint, intertrochanteric and other femur fractures for

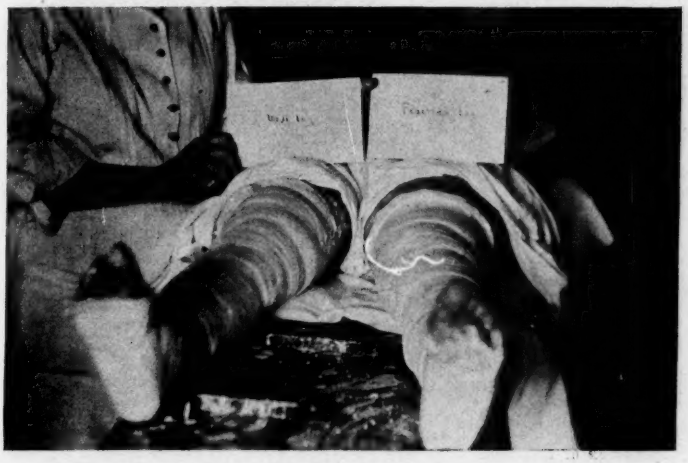

Fig. 2. First cast is applied as described in the text. Traction irons on table.

primary immobilization during transportations, subsidence of shock, or in cases of undue swelling from extensive trauma. If the fracture is in the *hip region* or pelvis, and there is no injury below the middle of the thigh and no swelling is therefore expected in the region where the cast is to be applied, the "traction irons" and cast can be applied as soon after the accident as is convenient. It is desirable to apply the traction irons as soon as possible because after application there will be no further pain, and the patient can handle himself by a "puller" for use of the bedpan, the head rest can be raised, and he can soon leave the hospital, as there is little "after care" needed except the care of the back.

If traction is placed on the leg before the cast is thoroughly dry, the long, longitudinal arm will dent the cast and cause pressure on the leg, and so cause discomfort or tissue pressure necrosis.

The usual trimming of the cast over patellas and behind the heel are of course necessary.

It is determined by x-ray whether the traction is securing proper reduction in unilateral pelvic fractures or simple tilting of pelvis.

Method of Application

1. The plaster cast is applied to the leg on the fractured side, from the middle of the thigh to and including the foot, and allowed partially to set. This cast should be reasonably thick, and only stockinet or no padding at all used, as the success of this method depends

Fig. 3. Traction irons in place on plaster pads, transverse bars parallel, ready for application of last cast.

on the cast's not slipping. The foot must be at right angles, and the pressure points will be over the instep, over both malleoli and behind the os calcis. Hence a pad is placed over each of these, and the cast molded snugly around them and above the knee joint. An additional precaution against slipping can be secured by applying a long strip of adhesive to the side of the leg from about the upper limit of the cast, and long enough to be drawn through a hole cut in the cast molded snugly around them and above the knee joint. An above the cast—to act as a sling. (Fig. 2.)

2. A folded *plaster strip* about 3 inches wide and about ½ inch thick should then be applied to the *site* of the application of the traction irons, which is to the inner side of the leg, just below the knee at the exact longitudinal center, with its long arm pointing downward in the direction of traction. If the contour of the leg does not permit the transverse bar to be at right angles to the leg, the padding under the longitudinal arm is then increased until this position is attained, otherwise the traction bolts will not fit through the holes in the transverse bar. They must be parallel to make even traction. (Fig. 3.)

3. More plaster bandages are then applied to the leg, incorporating the entire "traction iron" except the transverse bar. (Fig. 4.)

4. The same procedure is then carried out on the "well" leg, except that the traction iron is placed just above the internal malleolus, with the longitudinal arm pointing upward; that is, in the direction of counter traction.

Fig. 4. Application of irons completed and traction applied. Note left foot drawn down in traction.

5. A nut is then screwed on either end of the long bolts to a point near the center, and the ends are passed through the two holes provided on the ends of the two "transverse" arms. The remaining two nuts are then screwed on each of the long bolts, and only very slight traction secured, until the cast is thoroughly dry.

6. After the cast is thoroughly dry and set (about the following day) the two transverse arms are pressed together and the nuts tightened. The tightening is continued until the reduction is complete as shown by x-ray. There are many men who prefer in the

treatment of such fractures the Bradford frame, or a cast including the pelvis and both legs, or the Whitman method.

I am not offering this method as a substitute for any of the accepted methods, which in the judgment of the surgeon may better restore and maintain the fractures in their normal relations, but I am presenting an apparatus which will accomplish all the advantages of well leg counter traction if that method is indicated.

OBSERVATIONS ON EARLY DIAGNOSIS OF GASTRO-INTESTINAL CANCER

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THE object of this presentation is to discuss some problems in the diagnosis of gastro-intestinal cancer in such a manner as to be of practical value to the physician who lacks the advantages of continuous contact with a medical center. Of necessity he misses the inspiration and incentive for developing increased keenness in the art of diagnosis which such a center affords, for the great number of patients alone with their varied pathologic conditions keeps repeatedly fresh in the observer's mind the more unusual diseases to be looked for. The ideas and thoughts here expressed have been gained from practicing medicine in an average community in the South. My intention is merely to outline methods of investigating and to discuss some of the ideas gathered from actual experience in the handling of gastro-intestinal cancer.

Recently Cattell[1] expressed truly the situation regarding the early diagnosis of malignancy of the intestinal tract:

> In spite of repeated articles in the recent medical literature dealing with the early as well as with the late symptoms of this disease and with the educational measures carried out to inform the public, a large proportion of the patients who come to the surgeon for treatment have already had symptoms for nine months or more. While this does not exclude the possibility that many of these patients still have a prospect of cure, certainly the number of patients with extension beyond the local area of the bowel wall is considerably increased by this delay. If there is to be further improvement in the results from adequate treatment, it must largely result from the recognition of the earliest symptoms of the disease.

One of the chief reasons for delayed recognition of gastro-intestinal cancer is the difficulty one experiences in keeping attention alive to the possibility of its presence. This disease manifests itself in no unfailing, stereotyped, regular picture. The early evidences of its presence are very obscure and are often apparently far removed from the actual lesion which is causing them. As a result of energetic propaganda and effective education, both the laity and the profession are now more keenly aware of the possibility of malignancy of the breast than formerly. In fact, it must be the experience of physicians generally that many more patients consult them for lesions of the breast which are benign than for those which are malignant. We are told this condition is just the reverse of what

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Read before the Eighth Annual Assembly of The Southeastern Surgical Congress in Charlotte, March 8, 9 and 10, 1937.

it was before interest became widespread, giving proper importance even to remote findings which might indicate a cancer of the breast.

To bring about a similar situation in cancer of the gastro-intestinal tract there must exist in the mind of the observer an attitude of suspicion when certain symptoms and findings are present. Merely to recognize the old familiar tetrad, massive hemorrhage, obstruction, emaciation and tumor as the diagnostic findings of this disease means that there will be little hope of cure once a diagnosis is made. There must be other ways of at least suspecting its presence if the diagnosis is to be made sufficiently early to give a reasonable assurance of cure or good results from treatment. It is at this point of suspicion that the observer must begin his search for the malignant lesion. During 1935, 590 persons died in Florida from cancer of the gastro-intestinal tract. The average interval between the beginning of symptoms and the institution of operative relief was eleven months. Our work in Jacksonville shows that one or more of seven findings which should have suggested the possibility of cancer, had been present in the non-operable cases over a period ranging from three to five years. In the operable cases similar warnings were present for from four to eighteen months. In both instances valuable time, in months or years, was lost to the patient because someone did not heed the early warnings. The following seven reasons for suspicion are repeatedly brought to the attention of the members of our organization. Of course, any one or all of them may not be diagnostic, but the point is that they should be heeded, and when found in a patient, they should, we feel, throw on the investigators the burden of proof against the presence of cancer. These seven findings are as follows:

1. *Loss of appetite.* Obviously, loss of appetite is not diagnostic of gastro-intestinal malignancy, but, should it occur in a person who up to a definite time had eaten without suffering irregularities afterward, it should not be disregarded. It is frequently one of the earliest symptoms of cancer of the stomach.

2. *Fulness after eating.* This is another condition often indicating a lesion of the upper gastro-intestinal tract that may be of malignant nature.

3. *Weakness.* This condition may be due to many, many causes, but frequently results from lack of nourishment from the food which is eaten because the presence of a growth interferes with the physiology of digestion and thus prevents adequate utilization of the food. More frequently it may result from occult bleeding that establishes a secondary anemia. We have noted the condition

frequently in cancer of the right bowel and have had two patients come to us with no other complaint than weakness.

4. *Anemia.* The anemia in question results not from massive hemorrhage but from slow leakage at some point in the gastro-intestinal tract. It is not uncommon to find loss of blood from a lesion of the intestinal tract above the rectum of such intensity that the patient will become markedly anemic without recognizing blood in the stool. One patient we remember in particular was sent in for general examination because her dentist noted such marked pallor of the gums that he thought it significant of constitutional disease.

5. *Intermittent constipation and diarrhea.* We have found that this condition occurs very frequently in malignancy of the large bowel. This finding seems to vary in different clinics, but certainly it occurs with sufficient frequency in our experience to attract attention when mention of it occurs in the patient's history.

6. *Change in the color of the stool.* A dark purplish or reddish brown color would, of course, arouse the suspicion of hemorrhage. Frequently however, unless a patient is questioned directly as to color, he will not volunteer the information that he has noticed a change from the normal lighter stool. This information should be carefully sought.

7. *Change in gastro-intestinal life.* There might be added to the list gross hemorrhage, nausea and vomiting, as well as other symptoms, but those that are usually unpleasant enough to cause a patient to consult a physician constitute such marked deviations from the normal that the physician would easily recognize something had gone wrong. The important and difficult problem is to detect the less obvious. For that reason we stress earnestly this seventh point, namely, change in gastro-intestinal life. The change in question might be considered a summary of the six foregoing evidences which should arouse an active suspicion of gastro-intestinal cancer. Whenever an adult, especially one over 35, experiences a change from the normal activity of the gastro-intestinal tract sufficient for him to note, it should be assumed that something has taken place which deserves careful consideration and thorough study. There must be some cause for a decided change in the behavior of a person's gastro-intestinal tract after he partakes of food or while he is carrying on his normal routine of living. Should a patient be subject to any type of chronic indigestion, it is just as important in his case that the physician be apprised of this fact as it is for him to be told some other individual has begun to have indigestion when he was previously never conscious of his stomach.

Our study, therefore, should begin with the developing of an attitude of suspicion, and we should consider as suspects individuals exhibiting one or more of the seven evidences named.

With the observer's attention attracted to one or more of these seven irregularities, he is ready to evaluate their possible bearing on the presence or absence of cancer. In the first place, it is important to resist the temptation to turn immediately toward the mechanical aids in diagnosis for, indispensable though they are, a carefully obtained history and a thorough physical examination cannot be replaced by any mechanical measure. What the patient tells about his feelings, the character of the disturbance at the time, careful observation of signs, not only what the patient says but does, all frequently constitute the determining factor in diagnosis even after all the laboratory information has been presented. Certainly, before such a special investigation is carried out, two things should invariably be done:

1. A digital rectal examination should be made. This point has been stressed so frequently it is really surprising that such an examination is ever neglected.

2. The next procedure of importance is in our estimation an examination of the stool for either visible or occult blood. Upon the finding of occult blood we lay great stress. We do not pass it over as explained by some possible benign bleeding or hemorrhoid, but keep repeating the examination until the diagnosis is made or the bleeding clears up under restricted diet. We have learned to place great reliance upon the finding of blood as indicative of an area of ulceration somewhere in the gastro-intestinal tract from which the blood is coming. The obligation is to decide whether it may or may not be negligible. Should the digital rectal and the physical examinations appear negative and should there continue to be occult blood in the stool after sufficient time for it to clear up has elapsed, special studies then become in order. Among the first of these is gastric analysis, carried out chiefly for the purpose of finding whether there is blood in the stomach. With the recent improvements in the gastroscope it is now more generally possible to make a visual examination of the stomach wall. Herein lies a hope and a promise in the diagnosis of that distressing condition, cancer of the stomach. To be able to see what is in the stomach on the slightest suspicion may result in diagnosis of cancer of the stomach early enough to institute treatment which will lower its present appalling mortality.

The second special examination is made with the sigmoidoscope. Not infrequently the passing of this simple instrument up into

the lower segment of the large bowel will show the investigator the lesion, and he may be able to make a biopsy at once, thus arriving at an undisputed diagnosis in only a few minutes. This is the most useful instrument we have for investigating the rectum and lower sigmoid.

The third mechanical aid is a thorough roentgen study of the gastro-intestinal tract. The type of examination depends, of course, upon where the lesion may be located and the usual routine of the roentgenologist who is searching for it. Of all the aids in diagnosis, roentgen examination deserves the most credit for general service. For many reasons it is not infallible and it should not be used as a substitute for the various other methods of obtaining information.

In order to insure the performance of the proper procedures for gathering information so that the disease may not be missed in the patient in whom there is seemingly only a remote possibility of a malignant growth, we, in our work, have set down several rules:

1. Whenever a patient exhibits one or more of the seven findings enumerated, and especially when he recognizes a change in his gastro-intestinal life, he is considered a cancer suspect. Studies are then carried out to confirm or disprove the suspicion.

2. On every hospital patient and every out-patient who has a general medical study or has symptoms referable to the intestinal tract, a test for occult blood in the stool is made. The results of this test are respected.

3. A digital rectal examination is included as part of every diagnostic study.

4. Every patient with hemorrhoids receives not only a digital rectal but also a sigmoidoscopic examination. Perhaps this procedure makes possible the diagnosis of more cancerous growths than any other one measure. Cancer of the lower intestinal tract is so frequently confused with hemorrhoids that it is our rule in all cases of hemorrhoids not to discharge a patient until a sigmoidoscopic examination has been made. This we do before operation if feasible. Sometimes it is carried out when the patient is on the operating table and sometimes just before he is discharged. It is always done.

5. Every patient with a history of gastro-intestinal symptoms is submitted to roentgen examination, except when malignancy with obstruction is suspected in the lower gastro-intestinal tract and its presence is confirmed by sigmoidoscopic examination. Even then we may employ a barium enema in order to ascertain the degree of obstruction caused by the lesion.

6. When a lesion in the stomach is suspected, a gastroscopic examination is made unless it is contraindicated.

It is our conviction that the carrying out of studies such as I have outlined will result in the detection of gastro-intestinal lesions much earlier than is usually done at the present time. Correct diagnosis may thereby be attained increasingly early, thus happily lowering materially the general mortality in gastro-intestinal cancer. The suggested plan of procedure is one which can be carried out in some community in practically every county in the South. Certainly the facilities for its execution are available to every inhabitant of our section of the country without the necessity of traveling great distances. A large part of the work can be done in any physician's office. If, as a profession, we were to perform only the first steps of the plan, surely for many of those who now have malignant growths of the gastro-intestinal tract the future would be far brighter than it is at present. The two things every doctor can do in his office to direct patients along the right courses are: first, to suspect cancer when irregularities appear in the gastro-intestinal life of an individual of the "cancer age"; and, second, to determine the presence or absence of occult blood in the stool. If a diagnosis can be made when these evidences direct the physician's attention to a lesion rather than when such conclusive evidences as palpable tumor, emaciation and obstruction point to it, then rapid progress will be made toward the solution of the problem of gastro-intestinal cancer. It is with this conception of the problem in mind that we have ventured to outline a practical method for diagnosing gastro-intestinal cancer.

Summary

An attitude of suspicion on the part of the physician is a primary requisite in the early diagnosis of gastro-intestinal cancer. The seven evidences named, which should always arouse suspicion, are loss of appetite, fulness after eating, weakness, anemia, intermittent constipation and diarrhea, change in the color of the stool and, particularly, change in gastro-intestinal life in an adult. Such irregularities should suggest to the observer, first of all, a digital rectal examination followed by an examination of the stool for either visible or occult blood. The continued presence of blood in the stool calls for such special mechanical aids to diagnosis as gastric analysis, sigmoidoscopic examination and roentgen studies. The first steps of diagnostic procedure can be carried out in any physician's office and the further aids to early diagnosis are available within the bounds of practically every county in the South. Recognition of the earliest evidences of this disease offers a solution to the distressing problem of gastro-intestinal cancer.

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PYLOROSPASM AS AN ENTITY IN DIAGNOSIS

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THE mechanism of the workings of the pylorus is a subject that has long interested me. So often patients have come for consultation complaining of epigastric pain for which there was no immediate explanation and later pylorospasm was found to be the basis of the complaint. I have therefore for the past several years paid special attention to this anatomic structure in its normal action and in its abnormal behavior. Conditions that cause it to become spastic produce a series of symptoms which are certainly most distressing and often most incapacitating to the individual. I will not discuss hypertrophy of the pyloric muscle though the symptoms of the two conditions are at times closely allied.

Allow me to pause for a moment to review briefly the important points in the anatomy and physiology of the pars pylorica that are involved in this entity—pylorospasm. In the stomach there are found three layers of muscle tissue, an inner oblique, a middle circular and an outer longitudinal. As we near the pylorus this oblique layer becomes gradually less prominent so that at the pylorus it has completely blended with the circular layer leaving only the circular and longitudinal layers. The inner circular is better developed and is known as the pyloric sphincter. Fifty per cent of the longitudinal muscle fibers are said to pass into the circular layer acting as a dilator muscle of the pars pylorica. The muscles are caused to contract and relax normally due to a balance between two sets of nervous impulses. One set comes through the vagus nerve which contains a few sympathetic fibers and is predominantly motor in function. It usually causes a closure of the pylorus and more vigorous contractions of the muscles of the stomach. The second set of impulses traveling through the sympathetic nerves from the celiac ganglion are predominantly inhibitory in nature and usually cause a loss of tone of the gastric muscles and a relaxation of the pyloric sphincter. An overaction of either set of nerves will cause an imbalance and, therefore, a faulty behavior of this delicate mechanism. The extrinsic nerves to this particular region will not prevent the stomach or the pylorus from functioning in a proper fashion. It can function automatically as does the heart. Even the pyloric muscle can be removed and the stomach will empty normally as has been so

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Read before the Eighth Annual Assembly of The Southeastern Surgical Congress in Charlotte, March 8, 9 and 10, 1937.

often demonstrated after the operation of hemisphincterectomy for true hypertrophy of this structure.

Much work has been done on the pylorus both experimentally and clinically and its action has been found to be very complex. It is exceedingly difficult to believe that such a small division of the gastrointestinal tract can be the cause of such disabling symptoms.

It is no small wonder that the etiology of spasm is still a debatable question, when we realize that the factors bringing about a normal functioning of this intricate mechanism is not agreed upon by all observers, and the manner in which food is passed through the pylorus into the duodenum is vague. Some authorities believe the opening and closing of the pylorus depends on the relationship between the degrees of alkalinity and acidity on the two sides of the pylorus. Others believe it depends upon the stage of contraction of the pyloric muscle encountered by the wave passing along the stomach when it reaches the pylorus since the pyloric sphincter has a lower threshold for stimuli and a shorter latent period than the rest of the gastric muscle. The pylorus does remain open much of the time and if this peristaltic wave from the stomach reaches it at the proper time the gastric contents will be forced through the sphincter into the duodenum. Some of the peristaltic waves passing along the stomach never reach the pyloric region but completely fade out on their journey to this area. Alvarez[1] and Gianturco[2] have shed a new light on this mechanism by recording with motion pictures gastrointestinal movements as visualized under the x-ray. They believe that the explanation of this question is to be found in the duodenum and that it depends on relative pressures of the two sides. When the intragastric pressure is greater than the intraduodenal pressure the direction of the flow is from the stomach into the duodenum. When the intragastric pressure is less than the intraduodenal pressure the direction of the flow is from the duodenum into the stomach. If there are factors present which cause the pyloric sphincter to go into spasm then this mechanism is disrupted.

The pathogenesis of this spastic condition of the pars pylorica continues to be a debatable question. There is probably no single factor that brings about this dysfunction. It may occur at any time during life. The newborn babe or the tottering octogenarian may be its victim. In the primary cases many believe there is a failure of the nervous impulses to function properly and that its origin is in antenatal life. In cases secondary to lesions found elsewhere it is thought to be reflex in origin. Hughson[3] produced pylorospasm in dogs by causing injury of organs in or adjacent to the abdominal cavity and showed that it was due to a reflex irritation from the

peritoneal surface. The pyloric mechanism may have its normal activity upset by many kinds of stimuli. Chemical and mechanical stimulation of its mucous membrane, trauma to any of the abdominal organs and even stimulation of a peripheral sensory nerve will institute spasm of the pylorus.

The frequency with which pylorospasm occurs is not generally recognized by clinicians if we are guided by the number of such diagnoses recorded on the charts of the patients dismissed from the hospitals or by the number of reports appearing in the literature. It apparently is forgotten that the symptoms complained of by many patients suffering from gallbladder disease, appendicitis or peptic ulcer are those of pylorospasm and, of course, when the primary lesion is removed the symptoms abate. Many newborn infants are said to be suffering from hypertrophic pyloric stenosis and may even be operated upon when the real cause is only a pylorospasm that could possibly have been cured by medical means alone. In a ten year period from 1926-1935 in the John Gaston Hospital I could collect only 27 cases of pylorospasm as recorded on the charts and in the Baptist Memorial Hospital for the same period I could collect only 39 such diagnoses. However, in analyzing 2,517 gastrointestinal x-ray studies made at the Baptist Hospital from 1929 through ten months of 1936 there were 440 cases, an incidence of 17 per cent, in which spasm of the pylorus was detected by the roentgenologist. This is a greater frequency than was found when reviewing the charts of the patients who had been discharged from the hospitals. It is true that many of the x-ray studies showed the spasm to be mild and only temporary and the patients probably had no symptoms from the spasm but the fact remains spasm was present. Would it have been recognized without the aid of the x-ray? I doubt it. Was it considered as an entity by the clinician? I doubt it.

Although the true explanation of pylorospasm is not clear there are a number of conditions with which we frequently find it associated. According to the literature gallbladder disease, appendicitis and peptic ulcer are most frequently mentioned. My studies of the discharge sheets of the records of these two hospitals do not agree with these statements but the recorded findings of the x-ray examinations do coincide fairly closely as you will see.

The discharge sheets from the John Gaston Hospital showed 18 primary cases and 9 secondary cases that are listed in Table 1.

At the Baptist Hospital there were 26 primary cases and 13 cases secondary to other entities as in Table 2.

In the literature are noted a number of interesting conditions with pylorospasm as an outstanding feature. Bilateral inguinal hernias,

allergic conditions, helminthes, enlarged thymus glands and even cerebellar tumors have been reported as causative factors.

TABLE 1—CASES DISCHARGED FROM JOHN GASTON HOSPITAL (1926-35)

Primary cases		18
Secondary cases		9
Carcinoma of the pancreas	1	
Proctitis	1	
Acute otitis media	1	
Ulcerative colitis	1	
Acute upper respiratory infection	1	
Improper feeding	1	
Duodenal ulcer	1	
Acute conjunctivitis	1	
Newborn infant	1	
Total		27

In many of these patients x-rayed the spasm was very mild and temporary and no doubt was not of sufficient severity to produce

TABLE 2—CASES DISCHARGED FROM BAPTIST HOSPITAL (1926-35)

Primary cases		26
Secondary cases		13
Ulcer of the stomach?	1	
Cardiospasm	1	
Diet regulation	1	
Chronic constipation	1	
Internal hemorrhage	1	
Hypothyroidism	3	
Newborn infant	4	
Diarrhea	1	
Total		39

symptoms but in others the pylorospasm was undoubtedly a cause of the physical discomfort. I have attempted to determine the cause

TABLE 3—RESULTS OF X-RAY STUDIES

Number of cases in which gastro-intestinal x-rays were made	2,517
Number of cases of pylorospasm	440
Number of cases where x-ray study revealed the cause	367
Number of cases where x-ray study revealed no cause	73

of spasm in the 440 cases proven by the x-ray by noting any other pathologic disturbance as evidenced by this method of examination. It was impossible to secure the clinical diagnosis as the majority of these patients were not admitted to the hospital at the time the roentgenologic study was made and no history that would lead to the primary complaint accompanied the x-ray reports. There were

73 or 16.5 per cent of the 440 cases of pylorospasm where the x-ray findings were negative from an etiologic standpoint. The positive findings that were noted are as shown in Table 4.

TABLE 4—CAUSES OF PYLOROSPASM AS DETERMINED IN THE X-RAY STUDY

Appendicitis	119
Appendicitis and galbladder disease	9
Appendicitis and abscessed teeth	16
Appendicitis and sinusitis	13
Appendicitis, sinusitis and abscessed teeth	1
Appendicitis, gallbladder disease, colitis and abscessed teeth	1
Appendicitis and colitis	18
Appendicitis and diverticula of colon	1
Gallbladder disease	31
Gallbladder disease and colitis	3
Gallbladder disease and sinusitis (with abscessed teeth, 1)	2
Gallbladder disease and duodenal ulcer	2
Common duct obstruction (with stones, 1)	1
Duodenal ulcer (with diverticula of colon, 1)	17
Prepyloric ulcer	6
Prepyloric ulcer and appendicitis	1
Gastro-jejunal ulcer and diverticula of colon	1
Duodenal adhesions	1
Carcinoma of the stomach	1
Carcinoma of the rectosigmoid	2
Colitis	21
Colitis and abscessed teeth	1
Colitis and sinusitis	2
Colitis and duodenal diverticula	1
Colonic diverticula	8
Coloptosis and toxic goitre	1
Sinusitis	2
Abscessed teeth (with sinusitis, 1)	14
Gastro-intestinal tract spastic (with sinusitis, 1)	23
Small gut spastic	4
Small gut spastic and segmented—neurosis?	1
Intestinal parasites?	4
Newborn	14
Infancy	5
Eating toothpaste	1
Pulmonary tuberculosis	2
Tuberculous enteritis	2
Visceroptosis	1
Megalacolon	1
Cecal adhesions	2
Urethral calculus	2
Pelvic mass	1
Enlarged liver	1
Cecal fistula	1
Pancreatic enlargement	1

From this group of causes some interesting features are disclosed. Appendicitis was by far the greatest single causative factor. It manifested itself alone in 119 cases and was associated with other causes in 59 cases. Gallbladder disease was the next in order of frequency. Thirty-one of these cases were uncomplicated. This condition was associated with other causes in 18 more. Peptic ulcer ranked in fifth place with a total of 27 cases. In 28 cases part or all of the gastrointestinal tract was found in a spastic condition from some undetermined cause. Colitis alone or with other disturbances accounted for 46 cases. This entity is not often considered in the production of a spastic pylorus. A total of 19 cases were found in the newborn and in early infancy. There were 4 cases where the findings were typical of those produced by a parasitic infection of the gut tract and one case that was typical of patients suffering from neurosis. Fourteen patients had abscessed teeth and 21 had abscessed teeth associated with other disturbances.

One case in particular is of sufficient interest to report in some detail. A pediatrician referred to me a girl, aged 5, on whom he had made a diagnosis of acute appendicitis. The symptoms were typical of appendicitis but the physical findings were indefinite. The temperature and blood count were normal. Because of the vague physical findings I deemed it wise to have a gastrointestinal x-ray examination made. Greatly to my surprise a rather marked pylorospasm and a normally functioning appendix were revealed. Later it was learned from the child that she had recently acquired a taste for a well known brand of toothpaste and had eaten a considerable quantity over the past several days. When the toothpaste diet was eliminated all symptoms subsided. I believe this is the first report of pylorospasm caused by ingestion of toothpaste. I have been unable to locate any similar case reported in the literature.

From this list of causes we can see that the vast majority are due to infection. Infection within the abdominal cavity or infection outside the abdominal cavity. The infection is low grade and chronic in nature. In none of the cases is it acute. We can also see that there is a multiplicity of conditions that may initiate the pylorospasm varying from the simple abscessed tooth to the much dreaded carcinoma of the rectosigmoid. The location and severity of the underlying cause bears no relation to the degree of the pylorospasm produced, since a mild appendicitis may cause a more marked spasm than a badly diseased gallbladder or duodenal ulcer.

The symptoms oftentime simulate ulcer of the stomach so closely that the two conditions can be accurately differentiated only by the x-ray. The pain comes on after eating and increases in severity as

the digestion proceeds. It is relieved by vomiting or the taking of alkalies. Pylorospasm is found so frequently in association with ulcer that many believe the spasm is the cause of the pain in the presence of the ulcer. Some authorities believe pylorospasm is necessary for an ulcerated area in the stomach or duodenum to become chronic and believe it may precede the formation of ulcer. This is probably true since chronic peptic ulcer is impossible to produce in animals without an alteration in the normal course of the gastric contents whereby the mucous membrane lacks protection from the acidity of the gastric secretions. Vague and indefinite epigastric distress and gaseous eructations that are so frequent in gallbladder disease and chronic appendicitis, and occasionally in peptic ulcer are also encountered in pylorospasm. This is not difficult to understand when we consider the close relationship of the lymphatics of the appendiceal, gallbladder and pyloric regions and how the infecting lymph from one of these structures may thus produce irritation and subsequent spasm. Perhaps the spasm is an attempt on Nature's part to prevent the onward passage of the stomach contents to the diseased area. The pain at times may be so severe and sudden in its onset that one might be led to believe that some catastrophe has occurred within the abdominal cavity. I saw a case of this type occur in a boy 12 years of age. He was referred to me with a history of sudden severe epigastric pain. On admission to the hospital I was informed by the intern that there was a marked abdominal rigidity. When first seen by me about one hour later the rigidity had subsided and the pain had almost disappeared. While under observation in the hospital he had two similar attacks. A thorough study failed to reveal any demonstrable pathologic lesion except severe pylorospasm. The patient was discharged without operation.

At times we see cases of pylorospasm where there is no complaint of pain but only indigestion, which on further questioning is found to be gaseous eructations or even spitting up of sour fluid material. There seems to be no periodicity to this complaint and it may make its appearance irrespective of time or the character of the food eaten. Again the indigestion may be relieved by an alkali or it will subside spontaneously when the spasm has relaxed and allowed the partially digested food to pass onward.

There is the occasional case where vomiting alone is the reason for consultation. This is especially true in the newborn suffering from pylorospasm. The infant may lose so much of its nourishment that rapid weight loss and dehydration may cause the condition to become alarming. In older patients these deleterious effects are not so often encountered.

Rogatz[5] reports a case in an 8 months old child who had small amounts of blood in the vomitus. Dr. William R. Bethea, of Memphis, told me of an interesting case of pylorospasm he had some time ago. A boy, aged 6, was sent to him with a history of indigestion and epigastric pain which had existed for a period of two years. During this time the patient had two gastric hemorrhages. X-ray examination showed no gastric lesion except marked pylorospasm. There was also found a chronically diseased retrocecal appendix. The appendix was removed and recovery promptly ensued. These cases of hemorrhage from pylorospasm do occur but are extremely unusual.

Definite physical findings are usually wanting in these patients. Often there is tenderness in the epigastric region that may be more marked in the area overlying the pylorus. But, as is so often the case, the primary cause of the pylorospasm, when it is located within the abdomen, so overshadows this finding that it is ignored. This is particularly true when gallbladder disease or peptic ulcer is the etiologic factor. Rarely when the abdominal wall is thin a mass may be detected in the pyloric region if examination is made at the height of the spasm. In the majority of patients suffering from pylorospasm of a mild or moderate degree the physical findings are negative.

Gastric analysis offers no aid in the diagnosis of pylorospasm. The acidity may vary from below normal to much above normal. This great variation is dependent on the time the test is made in relation to the duration and degree of the spasm. Acidity will be found much higher in cases of severe spasm where the gastric contents have been prevented from passing into the duodenum for an unusually long time than in those cases where this evacuation from the stomach has occurred at the usual interval. However, it is advisable to have a gastric analysis made for it may give valuable information leading to the diagnosis of pathologic processes causing the pyloric spasm.

Aside from the symptoms and physical findings that lead us to suspect the presence of pylorospasm a roentgenologic study is the only mechanical means at our command today to prove definitely its presence. Spasm can be detected by the x-ray in either its mild or severe form and many times makes its presence known when the clinician has not suspected it. Spasm causes a smooth deformity about the pylorus that is not constant in its outline and may often be overcome by gentle massage with the hand of the examiner. It is usually relieved by atropine. The muscular contractions of the stomach are usually found to be deep and forceful. Pyloric stenosis, a condition that must often be distinguished from pyloric spasm, also shows a smooth deformity and characteristics very similar to spasm

but is neither relieved by massage nor atropine. Carcinoma in the pyloric region, which must also be differentiated from spasm, gives an irregular deformity which is constant. This deformity is unchanged by atropine or massage. The peristaltic waves are not as exaggerated as in pyloric stenosis and pyloric spasm. Occasionally masses outside of the stomach produce symptoms and x-ray findings that must be distinguished from pylorospasm. Here the deformity is usually on one side and often constant but may be made to disappear by changing the position of the patient while making the x-ray examination.

The symptoms and physical findings of pylorospasm are inconstant. It is from this indefinite symptom complex that we are led to suspect the presence of pylorospasm. Indefatigable search will usually reveal the cause or causes and appropriate treatment, be it medical or surgical, will afford the relief for which the patient so earnestly seeks.

Summary

1. Pylorospasm is a definite entity in diagnosis.

2. The symptom complex suggesting the presence of pylorospasm is often indefinite.

3. It occurs more frequently than is generally recognized.

4. Many different causes of pylorospasm are enumerated.

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THE PRESENT STATUS OF SURGERY OF THE OVARY

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IN London in 1783 an 8 foot, 8 inch giant by the name of O'Brien was exhibiting himself to the curious crowds in a show when suddenly he was made uncomfortable by the sharp penetrating eyes of a curious little English doctor, only 5 feet 2 inches in height. To add to his discomfort, the frank little doctor explained to him, bluntly, that giants are short-lived, and driven by an insatiable desire to examine the bones of this giant he requested the privilege of performing an autopsy at his death. O'Brien was overcome by horror at the possibilities of an early death, and was chilled at the thought of being dissected by this little man with the morbid curiosity. He, of course, refused, and made every effort to elude this little man who dogged his steps.

As time passed the doctor's prophecy became a reality, and as the big giant sickened he frantically moved from lodging to lodging, but wherever he went the piercing eyes of the doctor or of his man Howison were upon their prey.

The terror-stricken monster on his death bed gave explicit orders that his body must be saved from this mutilation, that it was to be carefully guarded and lowered into the middle of the Irish Channel in a leaden coffin. But a few drinks of whiskey and a bribe of 500 pounds diverted a watchman from his duty, and the body of the giant found its way to the boiling vat of the persistent little doctor, and his bones received not the oblivion of the Irish Channel, but the distinction of the Hunterian Museum of The Royal College of Surgeons.

This little man of the morbid curiosity, manifesting such interest in a condition which we know now to be a disease of the pituitary, was John Hunter, the surgeon, the investigator, and the man of vision, who two years later said in speaking of the ovary, "I can not see any reason why, when the disease can be ascertained in an early stage, we should not make an opening into the abdomen and extract the cyst itself. Why should not a woman suffer spaying without danger as well as animals do?"

Twenty-four years later, Dr. Ephraim McDowell of Danville, Kentucky, was to make this vision a reality. It is common knowledge

From Rush's Infirmary Clinic.

Read before the Eighth Annual Assembly of The Southeastern Surgical Congress, in Charlotte, March 8, 9 and 10, 1937.

to us all how Mrs. James Todd Crawford, whose abdomen was enormously distended, rode several days on horseback, supporting her protuberant abdomen on the pommel of the saddle, and how, upon her arrival at Danville, she underwent a twenty-five minute operation at the home of Ephraim McDowell, and how a large tumor was exposed, giving up fifteen pounds of gelatinous material, and a sack weighing seven pounds; and how, five days after the operation, she was up making her bed, and how, on the twenty-fifth day, she returned home on horseback. This famous woman lived to the age of 78. We know now that she suffered from a pseudomucinous cystadenoma.

Large Papillary Cystic Tumors

These comprise the majority of the large cystic growths of the ovary. The serous type is the more malignant of the two. It is generally appreciated that every ovary which is removed under a suspicion of malignancy should be opened and inspected by an assistant before the abdomen is closed. Should it be found malignant, the other ovary and uterus should be removed. Regardless of the age of the patient it is best to err on the side of radical surgery. Finding papillary projections on the inside of the tumor, with a thickening of the cyst wall in the region of a papillary projection, definitely takes it out of the benign class and places it with the probably malignant tumors.

The tapping of large cysts has given rise to two schools of thought. There is no doubt that the happy medium leaves the tapping to the discretion of the individual surgeon. Statistics apparently do not bear out the danger of spilling this content, but the same principles of cancer surgery applicable to other parts of the body, we feel, should guide us here. Where it is possible, moderately large cysts should certainly be removed in toto and without spilling, but in certain cases of huge growths and those which are firmly fixed the avoidance of severe shock from sudden relief of splanchnic pressure and the protection of the immediate well being of the patient most definitely indicate the simpler procedure.

Growths of the Ovary

Carcinoma: The finding of a carcinoma of one ovary definitely indicates *radical surgery;* that is, complete removal of the uterus and its appendages. The presence of carcinoma in both ovaries usually indicates a metastatic process and also requires thorough investigation of the gastrointestinal tract. Should the pathologic process be too extensive, having involved the intestines and peritoneum or omentum secondarily, a biopsy only is indicated. Following

surgery in these cases deep therapy seems to be indicated, not as a curative process but as a valuable means to retard the progress of an inoperable lesion.

In the case of the *Krukenberg tumor,* or metastatic carcinoma, the investigation of and attention to the primary lesion is, of course, of importance.

Fibrosarcoma: If, after the removal of an ovary, the lesion is demonstrated to be a simple fibroma, unilateral ablation only is necessary. Sarcoma, of course, requires radical surgery.

Dermoid: This embryonal type tumor requires surgery only for the affected side. Care must be used not to rupture them in removal as the contents are very irritating to the peritoneum.

Endometriosis

Many factors must be taken into consideration in the surgery of endometriosis.

It has been suggested by Samson that the lesion of peritoneal endometriosis can, in many instances, be ascribed to transtubal implantation. It is an abnormal growth of endometrial tissue in an alien location with a retention of blood in the cysts with which menstruation gives it the characteristic chocolate appearance; hence the name, chocolate cyst.

The most frequent location of the aberrant tissue is in one or both ovaries. Since the progress of the condition is concomitant with the menses, one hope for complete eradication of the condition is by the cessation of menstruation through the removal of both ovaries. That, of course, is the desired procedure in those women who are nearing the menopause. Even in some young women the process is so far advanced that bilateral ablation of the ovaries is most essential to the well being of the patient. But in many instances where the affection is confined to one ovary, in a young woman particularly, with future pregnancies desired, unilateral oophorectomy is strongly indicated, even though it is suspected that the condition exists in the opposite side and that a second operation will be required in a few years for the remedy of the condition.

Parovarian Cysts

Not much need be said about the parovarian cysts as they can most usually be removed by sharp and blunt dissection, making an incision through the peritoneum, freeing the cyst, clamping the vascular base, excising, and peritonealizing. Infrequently it is necessary to remove the ovary and tube of the affected side.

Simple Cysts of the Ovary

Simple cysts of the ovary are no longer the scapegoat for the lower abdomen. It demands careful investigation, palliation, and surgical conservatism. Those of us who are unfortunate enough to have to treat the nervous condition of castrated women have a most profound regard for the conservation of ovarian tissue. The simple cysts of the ovary, whether single or multiple, giving rise to no symptoms, are not surgical. If, because we are in the belly, we must do something, let us content ourselves with simply puncturing the cyst.

We are familiar with the type of ovary described by Schroder in which simple cysts of the ovary develop in association with endometrial hyperplasia. In this particular condition there is a prolonged menstrual interval followed by moderate bleeding of many days duration occurring mainly at puberty or near the menopause. It is usually a self-limited disease which improves under general supportive measures. Irradiation is recommended by some.

The second type of follicle cyst occurs with delayed menstruation and large and tender ovary associated with breast symptoms. This is an uncommon condition, but one that usually responds to partial resection of the ovary.

Then there is the tender cystic ovary associated with lower abdominal pain, but this condition fails to respond to general supportive measures, laparotomy with oophorectomy or resection is indicated. Many of these are inflammatory and, when associated with salpingitis, treatment is essentially that of salpingitis. Although the ovary itself has a rather abundant blood supply, unnecessary salpingectomy is to be avoided because the theory that salpingectomy cripples the blood supply to the ovary, increasing the tendency to cystic degeneration.

In those instances of severe pelvic inflammatory disease conservation of the ovary frequently becomes an impossibility.

Discussion

As to the cause of simple cysts of the ovary, many theories are advanced in an effort to explain the endocrine origin, cystic ovary following surgical operations, the cystic ovary after hysterectomy, and after salpingectomy, and the recurrent cystic ovary following the removal of its fellow of the opposite side. None of these theories are very convincing, and will not be entered into here.

In simple cysts of the ovary in those women under the menopausal age, in whom the mass measures less than 5 cm., a period of observation is usually indicated. In most simple cysts general meas-

ures may usually be wisely utilized. The treatment should aim at restoration of the ovarian function which frequently indicates suspension of the uterus, suspension of ovary, and at times shortening of the uterosacral ligaments in an effort to restore, as adequately as possible, ovarian blood supply.

A great problem in surgery of the ovary is that of preoperative diagnosis.

In closing we would like to mention one diagnostic adjunct with which we have had no personal experience, but which seems to offer most interesting possibilities, that is, peritoneoscope. It is an instrument constructed very much like a cystoscope. It is used for differential diagnosis in the abdomen, particularly for ovarian conditions in selected patients.

An incision 1 cm. in length is made, under local analgesia, in the middle of the abdomen, and a small trocar is pushed in through the peritoneum into the abdominal cavity. A pneumoperitoneum is then created using a small rubber manometer bulb to inject air into the peritoneal cavity. The trocar point is then replaced by a visual telescope. When the telescope is inserted with the patient in extreme Trendelenburg position, the uterus, tubes, and ovaries are brought into sight and the condition demonstrated while an assistant manipulates the uterus and adnexa with two fingers introduced into the vagina.

BENIGN TUMORS THAT DESTROY THE PATIENT

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THIS paper is presented in an attempt to stress the fact that many histologically benign tumors may be clinically malignant. In order to facilitate the presentation of this subject it will be necessary to define the terms that are employed.

By benign tumors are meant those tumors that do not metastasize to distant parts of the body but remain localized throughout their course. Multiple tumors of the same kind arising from the same type of tissue in various parts of the body due to a systemic dysfunction and exemplified by the multiple perineural fibromas and the angiomas arising over the cutaneous distribution of a peripheral nerve are considered benign.

By carcinoma is meant that tumor composed of atypical cells capable of metastasizing, which arise from the descendant cells of the primitive body covering, the ectoderm, and the lining of the gastrointestinal tract and its derivatives, the entoderm. Between these two cell layers the mesoderm gives rise to the bones, nerves, blood vessels, muscles, connective tissue, etc., from which may arise malignant tumors termed sarcoma.

While this classification may not meet the approval of all authorities in neoplastic diseases, it will be of value to the average neoplastologist who attempts to classify a tumor therapeutically rather than academically. It will be observed that under this classification certain types of tumors histologically considered malignant may be termed benign, for example, the basal cell epithelioma because of its tendency to remain localized. While other tumors appearing benign under the microscope are known to establish new growths in distant parts of the body and end lethally, examples of which are endometriosis, probably polyposis of the large bowel, certain fibromyomas of the uterus and rarely the hyatid mole.

The following selection of potentially fatal benign tumors is by no means complete, nor has the literature been drawn upon to any extent, but such examples are presented as have been observed in handling a large number of tumor cases over a period of years.

Classifying the methods by which death may be produced rather than by the location in the body or the histologic structure of the tumor the following groups are listed in order of their importance:

From the Charlotte Tumor Clinic.

Read before the Eighth Annual Assembly of The Southeastern Surgical Congress, Charlotte, March 8, 9 and 10, 1937.

1. Hemorrhage.
2. Mechanical obstruction.
3. Pressure.
4. Invasion of a vital organ.
5. Production of endocrine dysfunction.
6. Necrosis, toxemia, and infection.
7. The conversion of a benign tumor into a malignant tumor by injudicious therapy.

Hemorrhage

Non-physiologic hemorrhage from any body opening is serious and should be considered to come from a malignant tumor until proven otherwise. If the hemorrhage is of neoplastic origin the amount of bleeding is frequently inversely proportional to the degree of malignancy, for in the rapidly growing sarcoma or carcinoma there is usually a history of a small amount of bleeding at intervals over a period of time. There are two reasons for this: first, malignant cells require less nourishment than non-malignant cells and can build a barrier of cells beyond the larger vessels; second, the rapid growth of a malignant tumor does not allow time for the blood vessel to increase in size to such a degree that rupture will cause a large hemorrhage. There are exceptions, notably the erosion of the lingual artery from a carcinoma of the base of the tongue.

Hemorrhage from the vagina often means a contact erosion of a large vessel in a fibroid. In the nose a similar condition may occur in a benign polyp high in the nasal passage, and fatal hemorrhage may result from a benign polyp in the rectum or colon. Recently I observed a rupture of a hemangioma of the kidney pelvis. The hemorrhage was so severe that nephrectomy was necessary to save the life of the patient.

The treatment of such a condition is, of course, early diagnosis and rapid surgical interference. Diagnosis is usually obvious except in the case of intraperitoneal bleeding, which may be confused with an ectopic pregnancy or an acute abdominal condition.

In the bladder papilloma hemorrhage may be found very early in small lesions. These lesions are usually histologically benign but are so resistant to both radiation and surgical treatment and have so great a tendency to recur that from a destructive standpoint they may be considered as malignant neoplasms.

The benign lesions of the nasal passages usually arise from above the middle turbinates and frequently from a chronically infected ethmoid or sphenoid cell and though termed "nasal polyps" may vary in histologic structure. The bleeding frequently starts before the tumor can be easily visualized from below and there may be a

history of recurrent attacks of bleeding, or there may be a sudden hemorrhage so severe that the nasal passage must be tightly packed to control it. The bleeding comes from a contact ulcer of the tumor which should be snared off at its base before packing. The base is usually too high for the pedicle to be cauterized and there is often a prompt recurrence of the tumor which continues to grow with increased speed after each removal. Radiation offers but little. Histologically speaking the tumor is a fibromyxoma and since metastasis does not occur it must be classified as a benign lesion although often fatal to the patient. Occasionally a radical removal of the ethmoid and sphenoid cells on the affected side to which the pedicle is attached will control the lesion. This lesion must not be confused with the frankly malignant fibromyxosarcoma and the Schneiderian carcinoma which arise from the same region and which may become edematous and be grossly and symptomatically similar in appearance but cause death by direct cerebral involvement and distant metastases.

Hemangiomas frequently produce death by spontaneous or traumatic rupture, especially those in young children that occur intraorally and in the oro- and naso-pharynx. Bleeding may be very rapid in the cavernous type of lesion.

Death from a bleeding polyp of the stomach and small intestine is rare, but it is quite possible for this to occur. However, most of the papillomas of this region are potentially malignant and in the course of the disease eventually give rise to metastasis. The often observed cases of multiple polyps of the large bowel are subjected to many types of therapy, and much effort is expended by the therapist before the patient succumbs from hemorrhage, conversion to malignancy or too energetic therapy.

Even in removing tissue from tumors for diagnostic purposes hemorrhage is often a threat. In taking a biopsy from a non-ulcerated tumor of the esophagus or bronchus there is the possibility of its being an aneurysm which of course is fatal. I am familiar with one such case.

In the aspiration biopsy, which is gaining favor amongst many doctors, the entrance into a cavity of an aneurysm may produce an uncontrollable hemorrhage. This is not to be so greatly feared where the needle is employed, but with the various punch types of instruments which are on the market a fatal hemorrhage may be produced when a slice or segment of tissue is removed. In attempting to determine the presence or absence of cancer metastatic from the tongue to a small neck node, I have taken a segment from the carotid artery while using a biopsy punch which necessitated a rapid exposure and ligation of the artery.

Mechanical Obstruction

Under the heading of "mechanical obstruction" may be placed many well known benign obstructive tumors, the most common of which is probably the benign adenoma of the prostate whose modus operandi is too well known to warrant discussion. The tumor grows inward elevating the internal urethral orifice above the bladder so that the bladder is unable to empty itself completely. The residual urine acts as a culture medium for bacteria. While most of the bacteria are mild pathogens, the constant secretion of the toxins will lower the body resistance and allow an ascending infection to the kidney up a ureter dilated by back pressure. The cells of the kidney parenchyma weakened by the toxemia of infection and working against pressure become sickened and unable to perform their highly specialized excretory task so that uremia and death result.

The uterine fibroid may produce in the female a similar vicious cycle by pressure upon the ureters.

Such fibroids rarely attain the size they once did due to a wider distribution of excellently trained surgeons who recognize the condition early, but within the last few years the radiologist, enthused by the ever increasing sphere of the gamma and roentgen ray, has frequently failed to use the proper discrimination in the selection of cases for treatment so that occasional patients with large fibroids present themselves to the surgeon who must operate through a heavily irradiated and damaged abdominal wall which necessitates healing by tertiary intention.

The pressure of large fibroids upon the iliac vessels creates a greater demand on the heart to force the blood to the lower extremities which may result in an increased blood pressure and eventually heart enlargement and permanent damage. While intestinal obstruction from the pressure of benign pelvic tumors is rare, there is often marked obstipation and there are no doubt instances of death from obstruction due to such lesions.

It is interesting to note the length of time required for a fatal termination when obstruction is produced in various of the body passages. Roughly speaking death occurs when the gastrointestinal track is blocked in the following lengths of time: In the sigmoid colon or rectum, several days to several weeks. There are authentic cases of total obstipation for several months. In the large intestine, several days. In the small intestine death occurs more rapidly as the obstruction approaches the proximal end of the gut. In the upper part of the small intestine the average length of life will be only a few days depending to a large degree on the amount of intestinal content above the obstruction. Obstruction to the pyloric

end of the stomach may not cause death for several weeks due to the fact that the stomach may empty itself by reverse peristalsis. In obstruction of the esophagus death results only from starvation on the part of the patient in several weeks or months.

When the common bile duct becomes completely obstructed the patient may survive longer than a week. A cholecystoduodenostomy offers relief. Of the benign tumors in this location the papilloma of the ampulla of Vater and the pancreatic cyst have been reported as fatal obstructive lesions.

The benign carcinoid is often seen by the surgeon who has routine sections made of the removed appendix. It frequently invades the lumen or causes a pressure obstruction resulting in stasis, infection, abscess formation and, if not removed, death from rupture and peritonitis.

When the nasal passages are stopped the mouth may be used for breathing. When the bronchi or bronchioles are obstructed recovery may take place or a fairly rapid death may ensue from atelectasis and pneumonia, depending chiefly on the obstructing lesion. When the trachea becomes obstructed death rapidly ensues in from one to four minutes.

From the above time factors we can see that benign tumors in any of these locations may produce death. The most rapid case that I have on record is that of a man who for a period of weeks had complained of respiratory difficulty. A diagnosis of asthma had been made and various innocuous remedies employed. The respiration became so difficult that he was sent to the hospital. Upon being called into consultation early one night and believing the patient to have an obstructive laryngeal lesion, I advised immediate laryngoscopy. The patient became completely obstructed on the stretcher before reaching the operating room. A rapid tracheotomy was done but the patient could not be revived. An autopsy was obtained and there was found a small pedunculated fibroma 2 cm. in diameter attached to the mid posterior portion of the epiglottis which acted as a ball valve. When the patient was in a prone position with the neck extended he was able to breathe. In the manipulation of getting him on to the stretcher the pedunculated tumor became stuck in the larynx at the end of exhalation producing death almost instantly.

Benign tumors of the lower respiratory passages are rare. However fatal cases of many types of benign tumors of the trachea are reported in the literature.

Benign lesions of the esophagus are indeed rare, and in this day of modern surgery there are apparently few tumors that would come under the classification under discussion.

The production of an intestinal obstruction by an intracanalicular pedunculated tumor has been repeatedly observed. A peristaltic wave grasps the tumor and forces it along the lumen. The pedicle invaginates the gut wall at the point of attachment producing an intussusception and death unless surgically corrected.

I now have under treatment a 7 month old female negro infant which has a cavernous hemangioma on the posterior surface of the epiglottis and the medial portion of the right arytenoid. Respiration is difficult so that the child sleeps with its head in the opisthotonos position. While the lesions at these points may be controlled with the endotherm and interstitial radon, death will probably claim the infant because there are multiple massive cavernous hemangiomas over the area of distribution of the ninth cranial and the recurrent branch of the tenth cranial nerve on the right. This is a relatively frequent finding in the intraoral and facial hemangiomas of children. They usually occur over the distribution of a branch of a cranial nerve and frequently are bilateral.

Pressure

Probably the most widely recognized group of tumors that cause death by the production of pressure are the benign intracranial tumors. For a discussion of these tumors it is best to refer to some competent authority, as the group of intracranial tumors represents a specialty in itself.

The fibroma of the spinal cord, another benign tumor of the nervous system, frequently escapes detection until marked pressure symptoms are present. They are easily localized by the trained neurologist and with the assistance of the roentgenologist with his methods of lipiodol visualization the exact location of the tumor may be made and a removal done.

The osteochondroma due to the relative commonness of its occurrence occupies an important place amongst benign lesions. It may arise from any position in the body from bone, cartilage, or even from aberrant cartilage and tissue subjected to previous damage, as an old hematoma. Fortunately they are easily diagnosed by x-ray and the surgical removal usually produces a cure. An example of the lethal possibilities are presented in the following case.

A white female, 28 years of age, following a considerable loss of weight from hospitalization for acute appendicitis noticed a prominence in the region of the right sternoclavicular synchondrosis. Examination of the patient showed the head of the right clavical to extend outward for a distance of about 2 cm.; however, the tumor extended much deeper into the mediastinal space. X-ray examination showed an osteochondroma the size of a pear present in the mediastinum arising from the medial head of the right clavical. Surgical removal

was comparatively simple. However, if the tumor had gone untreated death would have resulted from pressure on the mediastinal organs.

The osteoclastoma per se is a benign tumor, yet it may and frequently does become malignant. Even the benign osteoclastoma may occur in such positions in the body as to incapacitate the patient or to cause his death. Especially is the seriousness of such a tumor emphasized when it occurs in the pelvic bones, vertebrae, or upper femoral shafts. I have seen two deaths from osteoclastoma of the ilium. One of the deaths was due to a total collapse of the sacrum and ilium producing a progressive paralysis of the lower extremities because of pressure upon the nerves and a lingering illness of over two years. The other death was hastened by an excessive dose of x-radiation to the lesion in the right ilium which caused a destruction of the skin. This was followed by necrosis, fungation of the tumor, infection and death, and should be listed under that head. Angiomas are reported occurring in the same regions and resulting in death.

The pressure upon the trachea by the benign and exceedingly radio-sensitive thymoma that occurs in infants accounts for many a death attributed to that vague and conveniently culpable disease status lymphaticus.

Other benign mediastinal tumors produce death by cardiac crowding, vessel erosion, and nerve impingement.

Invasion of Vital Organs

The most frequent type of invasive tumor that is seen in the cancer clinic is the basal cell epithelioma. Since this lesion rarely ever metastasizes, it must be classified as a benign lesion. The advanced type of basal cell tumor is rarely encountered in the large northern clinic. However, in the mountains of the South the advanced case is often seen. A large part of the face may be involved or missing. While such lesions are usually easily controlled by x-radiation so much tissue may be destroyed that repair is difficult. On the scalp for instance the tumor may be completely destroyed but in doing so the skull is exposed. Skin will not grow on eburnated bone so that in some cases epithelization is obtained by drilling numerous holes in the outer table and allowing the granulations to grow from the diplöe. Too often however an abscess and meningitis results.

In a certain number of cases direct invasion of vital organs will be the cause of death. Recently I saw a case that presented the typical Parkes Weber-Dimitri syndrome clinically manifested by epileptic seizures and an external hemangioma of the capillary type

which involved exactly one-half of the face from the bridge of the nose and the middle of the forehead and the middle of the chin posterior to the occiput. The patient died with evidence of intracranial involvement resulting from a similar type of growth within the brain.

Of the rarer lesions the cardiac tumors deserve mention. Mandelstamm collected 143 examples of primary heart tumors, 117 of which were classified as benign, the most common being the fibromyxoma arising from the subendothelial connective tissue of the interauricular septum and the valves. Many of these tumors however were possibly organizing thrombi. Primary cardiac tumors are never diagnosed before death, for a search of literature reveals only one case that was suspected of being a primary heart lesion and was later confirmed at autopsy. Metastatic lesions have been frequently diagnosed, a sudden heart block in a case afflicted with cancer being highly suggestive.

Production of Endocrine Dysfunction

Each year brings forth an increasing amount of literature upon the physiology of the endocrines in health and disease. Attempts to tie endocrine dysfunction with many recognized and some unrecognizable diseases serve to confuse the reader. However bit by bit experimental and clinical data are being amassed that point to a new field of medicine whose profundity has only been sounded. Each organ of specialized function, each type of tissue and without doubt each cell contributes its share of endocrine secretion which work together for the normal function of a healthy individual.

True research is the careful elimination of untruths and the amalgamation of truths. Valuable accomplishments are thus made by the concerted efforts of many over a long period of years, yet within a short few years extracts of the various endocrine glands and portions thereof have, according to literature, wrought miraculous cures upon many diseases and symptoms of disease, from dysmenorrhea to that most dreaded of all diseases, cancer, whose kaleidoscopic clinical manifestations place it in the category of being a sign and symptom of many body dysfunctions rather than a separate disease. There will never be a panacea for the control of all abnormal cell growths.

Of the endocrine glands the thyroid because of its frequent diseased state and its surgical accessibility has received much attention. The toxic adenoma produces death chiefly by cardiac damage and surgical interference. The cardiac damage is accompanied by a generalized muscle atony, often exophthalmos, increased basal

metabolism, emaciation, mental irritability, etc., the pathologic physiology of which has not been satisfactorily worked out.

Within the last few years the benign tumors of the anterior lobe of the pituitary have been extensively investigated, and remarkable palliation and even cures of the associated deformities have been accomplished by divided doses of x-radiation. While a rapid death from a benign pituitary tumor is rare the deformities produced and in some cases the speeding up the life process places it in the category of having at least a lethal intent.

Benign tumors of the parathyroid glands are responsible for a decalcification process which causes certain clinical manifestations such as osteitis fibrosa cystica and the formation of renal calculi.

There are two types of parathyroid tumors recognized, the benign hypertrophy of the so-called Wasserhelle cells and the true adenoma. At the present time they probably cannot be differentiated clinically. These tumors should be radiosensitive and since their locations are accessible to radiation there is a definite possibility that certain cases of nephrolithiasis and the associated bone lesions may be markedly benefited by the x-ray.

The benign adenoma of the adrenal cortex which causes precocious puberty in children and virilismus in adults deserves the tribute of recognition.

Necrosis, Toxemia and Infection

Most untreated large tumors will eventually develop areas of malnutrition due to insufficient blood supply. If the inhibition of cellular nourishment is slow, hyalinization will take place, if more rapid necrotic areas appear which act as a culture media for bacteria. Infection and toxemia result.

Large subcutaneous tumors tend to thin the skin by pressure and to cut down the blood supply so that the trauma of the clothes or bed causes an erosion that refuses to heal. In these cases erysipelas frequently is the direct cause of death.

All pedunculated tumors may become twisted on their pedicle resulting in the cutting off of blood supply. Tumors attached to the gut may cause a volvulus. Death from toxemia in either case may be the end result.

The Conversion of a Benign Tumor Into a Malignant Tumor by Injudicious Therapy

An example of this is the removal of benign lesions by inefficient methods such as acid applications, corn plasters, the escharotic pastes, and by the electric endotherm. In the treatment of moles

the following suggestions will not meet with universal approval. However, after observing a large number of malignant melanomas, and after carefully taking a history of the duration, the type of previous treatment and the appearance before the original treatment, it is my impression that by far the largest number of malignant melanomas are produced by the occasional therapist who, with the best of intentions, using the electric endotherm or the so-called electric needle, burns off the offending mole. This but produces a stimulating effect upon the growth of a dormant, but potentially malignant cell, a cell which is so malignant that by the time the diagnosis is made nothing can be done for the patient. I have never seen but one case of a melanoma which had metastasized, even if metastasis were only to a small adjacent node or to an intracutaneous island 0.5 cm. from the original lesion, that survived the 2-year period. The pigmented and the non-pigmented moles are potentially the deadliest of all benign lesions and are the most deadly after they take on malignant characteristics. Anticipating arguments in defense of the electric endotherm may it be stated that he who treats the occasional mole misses the opportunity of seeing the recurrent malignant lesion. The removal should be by wide surgical excision and by wide surgical excision alone.

The use of the electric endotherm while exploited by the manufacturer and too often by those seeking fame through innovation serves but little function in the armamentarium of a trained neoplastic surgeon.

In conclusion mention should be made of the early small breast tumor. Regardless of the proficiency or experience of the examining doctor it is a danger fraught with lethal possibilities when a diagnosis of a benign tumor is made and a removal not advised. Whether diagnosed fibroadenoma or cyst, galactocele or intracanalicular papilloma the occasional one even though it is an obvious clinical benignancy proves to be cancer, and what surgeon has not had a hopeless case of breast carcinoma say to him, "Doctor, I was advised so long as the lump didn't bother me for me not to bother it."

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SERIOUS COMPLICATIONS OF GALLBLADDER DISEASE

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CHOLECYSTIC disease is usually a progressive, permanent infection producing mild digestive symptoms and reflex or toxic manifestations in early adult life, recurrent attacks of biliary colic in middle life, and serious and often fatal complications in later life. As we see gallbladder diseases, a satisfactory classification on a clinico-pathologic basis divides them into three stages: (1) the stage of cholecystic infection, (2) the stage of colic, and (3) the stage of serious complications.

The first stage, that of catarrhal cholecystitis, is characterized by certain digestive symptoms: fulness and distress after eating, sour bitter eructations, belching, nausea and rarely vomiting. The patient often shows idiosyncrasy to certain foods, as shellfish, greasy foods, highly seasoned gumbos, pastries and the like. Idiosyncrasy toward certain foods and the inability to handle certain staple articles as fried foods, milk and eggs are suggestive of biliary disease. It is one of the most common conditions for which patients report to our offices periodically seeking relief from so-called biliousness, and is relieved temporarily by fasting, dieting and alkalis, duodenal drainage or by a calomel-saline course. Secondary and toxic symptoms may occur from this stage as rheumatism, myalgia, lumbago, chronic arthritis, neuralgia, sick headaches and often ocular symptoms. Operative work in this stage is easy and the mortality low, but unfortunately very few ever come to operation.

This is the stage of uncertain diagnosis and mild symptoms. The diagnostic aids of later stages are of no value here. This is the period of prescriptions and office calls and the usual therapy is to "two-dollar" them until they pass into the next stage of gallbladder disease. The gallbladder of this stage is often quite a problem to the surgeon in determining whether disease is present, even after laparotomy. In the more advanced cases the color of the walls changes from a translucent pearly grey to an opaque white color. In very chronic forms a fibrosis of the portion of liver adjacent to the gallbladder is present. On palpation the gallbladder itself is thickened. With a finger in the foramen of Winslow and the thumb applied anterior to the common duct, enlarged lymph nodes may usually be palpated.

Read before the Eighth Annual Assembly of The Southeastern Surgical Congress in Charlotte, N. C., March 8, 9 and 10, 1937.

After removal of the gallbladder characteristic changes may be seen on opening it. The lining papillae are enlarged and eroded. Yellowish cholesterin-coated papillae are often seen on the deep red background of the inflamed mucosa (strawberry gallbladder). Bacteria may be found in the mucosa and submucosa when absent from bile. The gallbladder bile is darker in color, thick and even tarry. When the inflammation is very acute the mucosa may be dark green or even black, and areas of ulceration may be found extending almost through the walls of the gallbladder with fibrinopurulent exudate on the serous surfaces.

The stage of colic is too familiar to all of us in its clinical features to warrant description. Nocturnal attacks of acute indigestion in middle-aged, obese persons, usually women—with a sense of deep internal catchy pressure, which is relieved by induced vomiting or requiring a hypodermic, and which is entirely relieved the following day—is almost surely a gallbladder colic. This stage is now the most important surgical condition of the gallbladder. Gallstones occur as mud, sand, gravel or stones.

Gallbladder infection is the most important cause of gallstones. Whatever other influences contribute to their formation, cholecystitis always precedes, so that stones are present as a result of a diseased gallbladder and not vice versa. Many strains of bacteria act upon bile and precipitate cholesterin and other bile substances. These may become bound together by a colloid and serve as a nucleus for stones. Infection predisposes to bile stasis, another important factor. Bile becomes inspissated and stagnation favors further spread of infection, a vicious circle. Blood coagula may serve for encrustation of calculi. Epithelial masses, pus cells, or fibrin may also be the beginning of calculi. Stasis is also favored by obesity, pregnancy, other forms of abdominal enlargement, sedentary mode of life, or any influence tending to reduce the movement of the abdominal walls and diaphragm.

What happens to gallstones after they are formed? More often than is supposed they remain in the gallbladder, grow larger and more numerous, entirely filling up the cavity and obstructing the cystic duct. The gallbladder seems to contract around them as a fibrosed shell, thus becoming functionless. Such gallbladders may be discovered incidentally in the course of other abdominal operations.

We may, therefore, have silent gallstones as well as silent kidney stones. In fact, it seems likely that the majority of gallstones do not move. There seems to be excellent evidence that in rare instances they dissolve or absorb. As evidence of this may be cited

instances in which the gallbladder contained solid faceted stones, those with beginning central solution, complete shells and rings, and C-shaped remnants. The explanation of such a process is a problem for a chemist. Anything bringing about a reversal of conditions which led to their formation would likely favor their solution.

Stones may become impacted and encapsulated in the cystic duct so that they cannot be dislodged by digital manipulation, and sometimes not be recognized. In such cases cholecystectomy is often an easier surgical procedure than cholecystostomy with removal of stones. Stones may also become walled in or encapsulated within a thickened fibrotic gallbladder wall. In drainage of such gallbladders there is likelihood of incomplete removal of stones. These may even dislodge and discharge through the cystostomy wound weeks or months later, thus explaining some of our short intervals for the re-formation of stones.

That part of the gallbladder wall in contact with a calculus for any length of time frequently shows atrophy of mucosa. This superficial loss of mucosa often heals to a smooth fibrous surface. The mechanical irritation and low grade inflammation may transform the gallbladder into a thick fibrous shell. There may be deep ulcerations from pressure and infection. Deep pockets may thus be produced which may even result in the production of fistulous tracts communicating with other viscera.

The stage of serious complications of gallbladder disease is the interval in which most of our operations will fall. Our patients want to put off surgery as long as possible, attempting milder means of cure. It is only when they reach the stage of most intense misery that they will allow surgery. The serious complications naturally are attended by a higher surgical mortality just as the complications of appendicitis make the surgical mortality of appendicitis high.

Purulent, gangrenous and ulcerative infections may be later complications. The gallbladder walls are rapidly invaded by the suppurative process and become dark green and black in patches. The peritoneum and regional structures are quickly involved and soon become adherent and covered with exudate. Perforation may occur resulting in a rapidly spreading general peritonitis. When the gangrenous process predominates there is actual sloughing of an entire segment of mucous membrane alone or of all the layers of the bladder wall with development of general peritonitis.

We have observed spontaneous perforation of the gallbladder five times in the past five years. The symptoms are those of acute peritonitis, the signs at first being localized around the gallbladder. There are severe pain, tenderness, abdominal rigidity, rapid and

feeble pulse, quickened respiration, vomiting and a rise of temperature. Later shock with marked distention and tympanites occur.

Laparotomy was performed in all of these cases. Infectious materials were swabbed out and washed away. Examination of the gallbladder then showed the perforation. Closure of the perforation and cholecystostomy should then be performed if possible. In one patient cholecystostomy was not possible because of the advanced pathologic changes, and drainage down to the gallbladder was employed. In two others, tube drainage at the site of the perforation was performed. In the remaining two the perforations were closed as well as possible and drainage from the fundus of the gallbladder performed. Two patients died of general peritonitis and paralytic ileus; the remaining three made satisfactory recoveries.

Ptosis of the gallbladder may occur in association with ptosis of other abdominal viscera or be present independently. It is favored by the presence of a distinct mesentery in a chronically infected gallbladder. The condition may produce no symptoms or the complaint be so vague and generalized that the true diagnosis is not suspected. The pedicle and neck may be subject to flexion and torsion. This causes temporary occlusion resulting in stagnation of bile irritation of the mucosa, which reacts by abundant secretion. By contraction of the diaphragm, peristalsis of the colon or change in posture, the gallbladder may raise itself, the flexure disappear and the gallbladder empty. On the other hand, the growing weight may increase the flexure until occlusion becomes permanent. In such cases the gallbladder may become enormous in size.

The symptoms of flexion and incomplete torsion are abdominal distress, colicky pains and digestive upsets. The attacks of pain may be violent and frequent. They are generally localized in the region of the gallbladder and radiate to the intercapsular region, abdomen or lumbar region. Pain usually bears no relationship to the ingestion of food but may be accompanied by nausea and vomiting. These attacks dicrease after a variable time to reappear and disappear successively. This condition may last for months or years and the attacks become more frequent and severe until the general condition becomes bad.

Complete torsion or volvulus of the gallbladder is a rare condition and the most serious complication that can happen in ptosis. It is necessary to distinguish between incomplete and complete torsion. In the former the circulation is incompletely obstructed from a partial or beginning twist of the pedicle and produces symptoms resembling cholecystitis or cholelithiasis and should be grouped with those cases of angulation or flexure of the cystic duct.

When complete torsion is present the twisting of the pedicle has progressed to a point sufficient to strangulate the blood supply and obstruct the cystic duct so that gangrene of the entire organ results. In 1932 we reported such a case which at that time was the twenty-sixth to be reviewed in the literature. At laparotomy a thick walled black gallbladder the size of a fist was found twisted in a clockwise direction on the cystic duct. Cholecystectomy was easily performed. Examination of the specimen showed plastic exudate over the serous surface. The content was that of bloody mucus and blood clots. No stones were present. The wall was about a centimeter thick, fibrotic and edematous. The mucosa was uniformly smooth throughout the entire inside. The patient remains well.

The most serious of all complications of gallbladder disease is cancer. It is a possible sequal of gallstones in every case, for when the gallbladder is explored or removed, gallstones are found in a large percentage of such patients. The exact percentage cannot be stated because the statistics of different observers do not agree, ranging from 75 to 92 per cent. But in the small proportion of gallbladders that show malignancy but no stones there is the suspicion that stones were present at one time, and induced the neoplastic change but escaped subsequently before operation.

In the past five years we have performed laparotomy in six patients with cancer of the bile tract and liver. The clinical picture in all was insidious and vague, with pain, jaundice and loss of weight the most notable findings. The diagnosis was thus uncertain, and must be made, if at all, on suspicion.

In four patients exploratory laparotomy only was performed. The malignant disease was so extensive as to make it difficult to identify the point of origin. Gallbladders were distorted and adherent to the carcinomatous liver and other regional structures. In the fifth patient cholecystostomy with removal of stones was performed. In the last case adenocarcinoma of the fundus of the gallbladder was discovered after cholecystectomy for cholecystitis with stones. With the recent death of this patient, most likely from metastases, the mortality in this series is 100 per cent.

A final complication deserving mention is the close association between gallbladder disease and certain circulatory troubles. There seems to be no question that gallbladder disease occasionally injures the heart and that removal of the diseased gallbladder occasionally effects a cure. It is certain that at least a confusing relationship exists between cholecystitis with stones and heart disease. In two instances we have discovered gallstones in the course of x-ray examination of the colon in patients who had supposedly suffered attacks

of angina pectoris for years. In these particular cases cholecystectomy was performed resulting in complete freedom from anginal attacks now three and four years respectively since the operation. The value of complete investigation of the gallbladder is therefore obvious, in all cases of circulatory troubles accompanied by so-called heart pain, anginal or anginoid, without valvular disease.

Summary

No series of cases is presented and nothing new is introduced in this discussion.

The prognosis in gallbladder disease depends to a large extent upon whether one adheres to the policy of watchful waiting.

Early diagnosis and earlier operation when the disease is still in the stage of infection, instead of allowing it to progress to the stage of serious complications, will greatly lower the mortality and morbidity in gallbladder disease.

The Southern Surgeon

Published Bi-monthly by
The SOUTHERN SURGEON PUBLISHING COMPANY
701 Hurt Building
ATLANTA

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Subscription in the United States, $4.00

VOLUME VI AUGUST, 1937 NUMBER 4

THE EVOLUTION AND PROGRESS OF TRAUMATIC SURGERY AND INDUSTRIAL MEDICINE

Any discussion or consideration of the broad subject of traumatic surgery and its development must be predicated upon our knowledge of the records of its antiquity. The most ancient surgical writings record the therapy that was applied to the injured. There is evidence of the application of surgery before any written reports were available.

It may be well to define the word "trauma" as we understand its meaning at the present time. Trauma may be defined in its largest sense, as any force or action which causes a destruction of or a disturbance in any anatomic or physiologic function of the organism.

The history of bone injuries and the surgery of bones enjoy an antiquity more remote than the records of other phases of medical or surgical practices. One is surprised when he reviews ancient medical history, to note the clarity of thought and understanding with which these early writers made their observations and arrived at their conclusions. Their reasoning by induction and deduction was most clear, logical and concise, particularly when one remembers that they had so little knowledge of anatomy, physiology and the circulation of blood.

Hippocrates and Galen wrote and taught much that would be sound today as it was related to the care of the injured and the complications that resulted. They well understood the value of traction and subsequent splinting in the reduction and the treatment of fractures and dislocations.

Read before the Eighth Annual Assembly of The Southeastern Surgical Congress in Charlotte, March 8, 9 and 10, 1937.

The methods they used were most ingenious and practical. The knowledge these surgeons living 2,000 years ago had of the necessity of avoiding damage to soft tissues from pressure is remarkable.

In the era of Hippocrates and Galen, pus in a wound was not thought desirable. Sequestra of bone in compound fractures and osteomyelitis were recognized and their removal advocated by these early teachers.

Galen, in commenting upon the treatment of fractures said, "It should be kept in mind that exercise strengthens and inactivity wastes."

In this age, 2,000 years ago, they recognized the importance of cleanliness in the care of open wounds and advised against all irritants in such wounds.

From the fourth to the twelfth century very little was accomplished in surgical progress. In fact, there seems to have been a retrogression in the application of the sound fundamental knowledge that had been obtained from the experiences and observations of those keen thinkers of the previous centuries. It may be noted that during this period the Arabs were foremost in the study and teaching of surgery. Any advancement they may have achieved was curtailed by mysticism and their contributions were not productive of any particular progress.

It is a strange human coincidence that an artist, Leonardo da Vinci (1452-1518) should have advanced the study of anatomy as he did. His motive was to consider the contours and actions of muscle as they were related to the form of the human body and as a result his work gave a great impetus to the scientific study of anatomy and laid the foundation for further research by physicians which served to advance the knowledge of the anatomical structures.

A new era of surgical advancement dawned with the work and teaching of Ambroise Paré (1510-1590). This independent thinker and keen observer disregarded the traditional and accepted practices of his time and adopted many original methods. You are all familiar with his life and work. Little comment is necessary. His use of a tourniquet in amputations, his resection of joints and the ligature of bleeding vessels were outstanding achievements for that period as they were related to the evolution of traumatic surgery.

Bernardo Ramazzini (1633-1714) is frequently referred to as the father of industrial medicine. His human and catholic interest in his fellow men in all walks of life, prompted his study and his recording of industrial diseases, including dust-borne infections. He also investigated metal and chemical poisoning. His recognition of der-

matitis as caused by the workers' occupation and his writings on these subjects were most comprehensive.

In the seventeenth century, Harvey described the circulation of the blood, which discovery so revolutionized the progress of surgery. The work of John Hunter on inflammation was most significant.

Lapoyede and Sicre, French surgeons, are credited with having used wire, in the eighteenth century, for the fixation of the fragments in fractures.

During the nineteenth century, a better understanding of pathology as taught by Virchow (1821-1902) perhaps advanced our knowledge of medicine and surgery more rapidly than any other one accomplishment in that period.

Then came Louis Pasteur (1822-1895) who so successfully demonstrated the action of living organisms in tissue. This discovery revolutionized the surgical thought that then existed in reference to wound infection and wound healing.

Lister lived (1827-1912). Who does not know of the innovation of antiseptic surgery as initiated by this great master? His work was based upon the discoveries of Pasteur. These two contributions in the nineteenth century revolutionized the technic and practice of surgery and opened vast fields for investigative research. The practical results were reflected in the increase in the number of pathologic conditions that became amenable to surgical therapy.

In 1895, William Konrad Roentgen discovered and applied the x-ray to the study of disease. The far reaching value of this discovery in the evolution of traumatic surgery cannot be overstated and this fact is well understood and recognized by all surgeons of today.

This brief and rather superficial, sketchy review of medical history brings the evolution of traumatic surgery to a period within the memory of many of us.

During the Spanish-American War, Nicholas Senn advocated prompt operation for gunshot wounds of the abdomen. His writings and teachings at this period greatly enlightened our understanding of traumatic surgery.

During the last two decades of the nineteenth century, Christian Fenger and John B. Murphy were responsible for epoch-making contributions to the subject of surgery as it was related to the injured.

Fenger was an untiring worker who had a knowledge of surgical pathology that few men possessed at that time.

Murphy had that investigative type of mind with an original initiative that made for progress. His striking personality and dynamic method of presenting a subject made his logic and reasoning

most convincing. He was the greatest surgical teacher of his time.

One would be remiss in his plain duty, if he failed to record here the important contributions of two men, who did so much to add to our knowledge of this department of surgery during the early years of the twentieth century.

FIRST, Dr. Harvey Cushing, whose research in the study of head injuries paved the way to a better understanding of this complex subject.

SECOND, Dr. Allen Kanavel's organized and classic study of infection of the hand is so well known that little emphasis need be placed upon its importance.

Dr. Kanavel's scientific investigation and the report of his observations will stand out in surgical history as an epoch-making advance in our surgical knowledge of a condition that occurs so frequently as a result of injury. Previous to his research our accurate knowledge of this important subject was limited. The value of this work to humanity can not be overstated.

A review of the changes in surgical technic that developed during the last part of the nineteenth century would be superfluous at this time. It is well known to you that there were some effects of these changes in technic that were vital to the progress of surgery as it then applied to the injured.

Previously the older surgeons of this period had been chiefly concerned with traumatic surgery and their work consisted largely in the study and treatment of the injured. From 1885 until 1900 there was that enormous increase in the number of operations, due to the fact that under the modern technic of antisepsis and asepsis they could be performed without undue mortality or morbidity. All of this operative activity led to a diminished interest in the pathology and treatment of the injured. Attention was directed to diseases amenable to surgical treatment. Unfortunately, some of us became too deeply interested in the surgery of the stomach, the gallbladder and the pelvic organs to the exclusion of attention to fractures and dislocations. Progress in traumatic surgery fell by the wayside during this period.

This phase of surgery to the injured was not then and is not now taught in medical schools with the thoughtfulness that the importance of the subject demands. A new interest is now manifested in this situation and its problems by the ever and ever increasing number of more and more serious injuries incident to the mechanization of every form of transportation and the advent of machines to do the work that was formerly done by manual labor.

The surgeons in this audience appreciate fully the enormous influence the experience gained in treatment of wounds in the World War has had on the progress of this type of surgical therapy to the injured during our generation. You know the men that contributed to this knowledge. May I digress for the moment to pay tribute to that great character and eminent surgeon, Sir Anthony Bolby, whom I so admired and respected. He was Chief Surgical Consultant with the British Army in France and was an ardent advocate of immediate operation in gunshot wounds of the abdomen, debridement with immediate closure of the wounds and skeletal traction for fractures of the long bones.

It is my feeling that our war experience in surgery did not greatly change the basic surgical principles previously or then in vogue. Any advancement in our knowledge came rather through a better understanding of these principles and their general routine application. Nevertheless, the observations made by the surgeons of all the countries engaged in this great war, with its millions of wounded, have had a compelling influence on the progress of the surgery as applied to the injured. This is particularly true in reference to four phases of now recognized and generalized surgical therapy.

FIRST: In the treatment of compound fractures, the principle of debridement or excision of all devitalized tissue has become universally recognized as sound practice. It is now generally utilized. In this connection, there are two schools of thought regarding the question of drainage in these wounds. It is my personal conviction and contention that drainage of any kind should never be used in these cases; for it practically always leads to infection and subsequent suppuration. The wounds should be closed whenever the amount of vitalized skin renders this feasible.

SECOND: Antiseptics of all colors, creeds and chemical combinations, fell into disrepute when we learned that the excision of devitalized tissue or aseptic treatment of the wounds gave us infinitely better results. Some of us doubt if antiseptics will ever regain their former prestige and popularity.

THIRD: Skeletal traction in fractures of the long bones became popularized during the war period. This method of treatment had not been used universally up to this time. It was my privilege to have been the first to inaugurate this method of treating fractures of the femur as a routine practice during the war in the Base Hospitals of the British Army. This work was first done in the British Base Hospital Number 18 by the personnel of the United States Base Hospital Unit No. 12. The caliper applied to the condyles of the femur was the method employed. We were rigidly questioned

and the method carefully observed by the British Consultants for the first few weeks of its use. Our observation and comments on this work were reported in the A. M. A. Journal, November, 1917. It is gratifying to record that the British adopted this method of using the caliper for obtaining skeletal traction in an extensive number of cases, many of which I had the opportunity of observing. Later skeletal traction was used extensively in the French and American Armies. Its generalized use at present is well known as it is applied to fractures of all long bones.

FOURTH: The extensive use of antitetanic serum demonstrated beyond dispute its value as a protective agent. During my entire service in France I saw only two cases of tetanus. The Germans did not have an adequate supply of antitetanic serum during the early months of the war and the death rate from tetanus was enormous. The value of this serum was well recognized before the war. This added experience confirmed our knowledge.

It was in 1926 that the American College of Surgeons first evinced an active interest in traumatic surgery and industrial medicine.

A committee was appointed by that organization at this time to make a preliminary survey of the situation with the thought of ascertaining the kind of work that was being done and the end results that were being obtained in the treatment of the injured. This committee consisted of Dr. John Walker, Chairman; Dr. A. W. Lazenby, Secretary; Dr. D. J. Dunott, Dr. Carl H. Fornell and Dr. Frederic A. Besley. The results of this survey and analysis of a large number of histories in the files of several insurance companies were most illuminating and instructive. The necessity for education for improvement in methods then being employed was so evident and obvious that the late Dr. Franklin Martin, with his usual vision and initiative, appointed a permanent Committee on Industrial Medicine and Traumatic Surgery.

The following is the summary of the report made by the preliminary committee:

REPORT OF THE COMMITTEE ON TRAUMATIC SURGERY TO THE BOARD OF REGENTS.

AMERICAN COLLEGE OF SURGEONS. OCTOBER 26, 1936.

Your Committee, appointed for consideration of the improvement of conditions in Traumatic Surgery, begs leave to submit the following report which is based on the finding of a committee composed of industrial surgeons and representative of certain indemnity companies:

1. Whereas, our review indicates that generally traumatic injuries have not been cared for by the better qualified in surgery, and

2. Whereas, we feel that a considerable amount of blame for this situation is due to past practices of insurance carriers, to a failure on the part of employers

to cooperate and to a disinclination on the part of the better qualified surgeons to interest themselves in this field of activity, and

3. Whereas, there is a very definite and aggressive attitude displayed by a number of doctors in soliciting this character of work by unethical advertising and other procedures which do not conform to our code of ethics, and

4. Whereas, there is a strong tendency towards a commercialization of this service, and all of these militate against the well-being of those injured in industry, and

5. Whereas, now there is a very definite trend on the part of carriers of Workmen's Compensation insurance and of large employers of labor to obtain more experienced surgeons and better hospital facilities, and in view of the other findings submitted herewith in the report of the Research Group of the Committee on Traumatic Surgery.

THEREFORE, be it recommended to the Board of Regents of the American College of Surgeons that the following minimum standard pertaining to the practice of Traumatic Surgery be adopted by the Board of Regents:

1. That all hospitals receiving traumatic cases for treatment be required to meet the minimum standard requirements of the American College of Surgeons.

2. That each of these hospitals shall have a Committee responsible for the supervision of Traumatic Surgery.

3. That a surgeon approved to treat traumatic cases shall be—

   a. A graduate of scientific medicine in good standing and licensed to practice in his respective State or Province.

   b. Competent in the field of traumatic surgery.

   c. Worthy in character and in matters of professional ethics; that in the latter connection the practice of division of fees under any guise whatever be prohibited.

4. That surgeons dealing with traumatic cases shall keep accurate and complete case records of all patients—a complete record being one which includes:

   Immediate record of injury,
   Detailed description of physical findings,
   Adequate record of treatment,
   A record of estimated period of disability,
   The end results, where possible—and

these records shall be filed so that they are available at all times for submission as shall be required.

5. That surgeons and hospitals dealing with traumatic cases shall be equipped with adequate diagnostic and therapeutic facilities.

And, be it further recommended that a Committee be appointed for the purpose of carrying on these studies and the making of recommendations to

your Committee with a view to improving the services in this field, which is of such great economic importance.

JOHN B. WALKER, New York
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J. E. BACON, Miami, Arizona
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E. A. ARCHIBALD, Montreal
C. H. MAYO, Rochester
FREDERIC A. BESLEY, *Chairman,* Chicago

Such a committee was appointed.

Following its traditional policy of education, the American College of Surgeons arranged for conferences on industrial medicine and traumatic surgery at its annual meetings and the first one was held at Detroit in 1927. Each year since that time there has been a symposium upon this complex subject at the Clinical Congress of Surgeons and at the sectional meetings, and all phases of the interests of patients, physicians, employers, employees and insurance companies have been presented and considered.

The educational program has for its objective the building of a firm and substantial foundation of education relative to the progress of this essential development of medical service. Clearly such an objective involves the correlation of many interests and activities which, fortunately, do not conflict. The early activities of the Committee on Industrial Medicine and Traumatic Surgery can be briefly summarized.

It was realized that all real progress in the care of the injured depends upon the improvement in the teaching of this subject and the emphasis placed upon it in the curricula of the medical schools in both the undergraduate and the postgraduate courses.

It was at first difficult to elicit any deep interest in this thought but gradually surgical teachers are recognizing the necessity for a better understanding of the accepted methods of treating the ever increasing number of the injured. The curricula in the medical schools are being broadened in this department of surgery.

Intimate contacts with all interested agencies have been made and have resulted in a broader conception of the need for continued education in traumatic surgery and industrial medicine.

The Department of Hospital Activities of the American College of Surgeons is in daily contact with over 3,000 hospitals of over 25

beds in the United States and Canada. These institutions have been made familiar with the work of the Committee on Traumatic Surgery and their cooperation has been secured. They are providing more adequate equipment for the care of the injured. In many of these hospitals there now exists a consulting committee of the surgeons of the staff who are especially qualified in the care of fractures. These committees are being called upon to see most of the serious cases and are rendering a very valuable service leading to improvement in the application of approved methods.

The next step on the part of the College, in an attempt to improve the medical service rendered to the workers in industry who became sick or injured as a result of their occupation, was to formulate and execute a plan for the inspection and survey of the medical departments in the larger industries. The thought was to grant the approval of the American College of Surgeons to such industrial organizations as could comply with a proposed minimum standard. The following is the standard:

Standard for Medical Service

This standard to be required of Industries, Hospitals, Insurance Carriers, and others desiring recognition and approval by the College.

1. A medical department devoted to the care of the injured shall be under the direction of a carefully selected physician who is responsible for the administration of the service and for the professional care of patients, subject to the approval of the governing body of the department. The personnel shall consist of at least:
   - *a.* a competent physician,
   - *b.* a trained nurse, or the equivalent,
   - *c.* a consulting staff of specialists officially appointed to advise and participate in the treatment of special cases.
2. The management of the medical department shall adopt rules and regulations governing the policies and professional work of the department. These rules and regulations shall provide:
   - *a.* That the principles of the Standard for Medical Service be adopted.
   - *b.* That there shall be prepared a monthly report which summarized the nature and extent of the injuries and the results of their treatment.
3. Facilities for the treatment of the injured shall consist of:
   - *a.* An efficient transportation service.
   - *b.* A casualty department in a hospital consisting of receiving, operating, and recovery rooms adequately equipped for diagnosis and treatment with accessible clinical laboratory, x-ray, and physical therapy services all under competent medical supervision.
   - *c.* A system of case records filed accessibly and cross indexed—a complete case record being one which includes identification data; cause of accident; nature and extent of the injury with detailed physical findings; special examination, such as consultations, clinical labora-

tory and x-ray; tentative diagnosis and prognosis with an estimated period of disability; progress notes and additional information required by law in the case of a claimant for Workmen's Compensation.

4. Physicians designated to treat traumatic cases shall be:
   a. Graduates of medicine in good standing and legally licensed to practice in the state or province.
   b. Competent in the practice of traumatic surgery.
   c. Worthy in character and in matters of professional ethics; in the latter connection the division of fees, under any guise whatsoever, shall be prohibited.
   d. Familiar with the principles of compensation law and contact.
5. Medical departments shall fulfill the requirements of the Workmen's Compensation law when treating employees of industry.
6. A hospital which maintains a department for the treatment of traumatic cases shall meet the Minimum Standard of the American College of Surgeons.
7. Sanitary conditions, accident prevention measures and health supervision of employees shall be provided for industrial and commercial establishments and in so far as possible to be under the general supervision of the medical department head.

Up to the present time there have been surveyed 1,630 medical departments in industry and 850 have received the approval of the College because of their compliance with the requirements of this minimum standard.

This work is being carried forward with renewed zeal and there is an ever increasing interest on the part of the leaders in industry in the care of their employees. Their desire to secure the approval of the College is most gratifying and is the stimulus that prompts the improvement in their medical departments in an effort to meet the minimum standard.

It is our contention that this work is doing much in achieving an essential advance in the medical care of the employees in industry who constitute such a large part of our population.

Can we visualize and predict what progress will be made in the future service that will be given to the victims of accidents and the sufferers from occupational diseases? It is usually dangerous to prophesy and yet it is an axiom that achievement and progress are accomplished when necessity demands it. There is every indication that the care now given can and should be improved upon. The demand is imperative.

It may be assumed that the surgical profession appreciates the necessity for better therapeutic methods both preventive and curative as they are related to industrial medicine and traumatic surgery and in their traditional way they will bring this about.

The deans and heads of surgical departments in the medical schools are seeing the light; for there is a notable increase in the

number of teaching hours that have been assigned to the department of traumatic surgery.

It is being recognized that there is a need for a larger place in the curricula for the teaching of occupational diseases and a study of their prevention. Research departments are being inaugurated in several universities for the purpose of studying occupational diseases. All of this will make for betterment and is immensely significant.

The work being done by the Committees in Hospitals that have been inaugurated by Dr. Malcolm MacEachern, head of the Hospital Standardization of the American College of Surgeons, is a real educational accomplishment. This will be continued and enlarged.

Meetings of surgeons where theories and new surgical principles can be advanced and discussed, make for progress even though there is a controversial difference of opinion.

The pursuit of any scientific truth knows no race or national boundary lines and an exchange of ideas among scientists of different nationalities, dealing with facts, can and will do much to secure a better understanding of the social, economic, political and educational structure of any nation.

One wonders if this correlation of the work of scientists of all nations will not be a compelling force that may some day lead to international peace and thus secure and stabilize a better civilization. May I pay my sincere tribute to the Southeastern Surgical Congress for their achievement in increasing our knowledge of scientific surgery.

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BOOK REVIEWS

The Editors of THE SOUTHERN SURGEON *will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The Editors do not, however, agree to review all books that have been submitted without solicitation.*

THE LARYNX AND ITS DISEASES. By CHEVALIER JACKSON, M. D., Sc. D., LL. D., F. A. C. S., Professor of Bronchoscopy and Esophagoscopy, Temple University, Philadelphia, and CHEVALIER L. JACKSON, A. B., M. D., M. Sc. (Med), F. A. C. S., Professor of Clinical Bronchoscopy and Esophagoscopy, Temple University, Philadelphia. 555 pages with 221 illustrations, including 11 plates in color. Price, $8. Philadelphia and London: W. B. Saunders Company, 1937.

In the absence of any other recent book in this country devoted to the larynx, this new work fills an urgent need. Indeed one is inclined to believe that, if twenty books had been published on the subject in the past year, this book would more than justify itself. Certainly the surgery of no other organ has been advanced more rapidly in recent years and certainly no one has contributed more to this advance than Chevalier Jackson. One is tempted to reproduce the introduction. In this the authors point out the obstetrician "today considers it essential to exclude laryngeal obstruction before maltreating a newborn babe to make him breathe; and he wishes to know how to treat such obstruction when present. . . . The pediatrician wishes to know which one of over a dozen different conditions is giving his patient a congenital laryngeal stridor and what should be done to cure it." And so on through the seven ages of man, the laryngologist by prompt examination may now diagnose accurately some of the difficulties that confront the family doctor, the internist, the dermatologist and indeed every other practitioner.

To one's relief a single paragraph is devoted to the anatomy of the larynx, the reader being referred to the standard texts of anatomy and to the dissecting room. The physiology of the larynx however is taken up in considerable detail and the discussion of its nine functions will prove enlightening to most physicians.

Although many of the technical details as to laryngoscopic examination as well as the operative procedures are over the heads of most of us, these are exquisitely delineated for guidance of the larvngologist. The general reader will be benefited by most of the book. He will particularly enjoy the illustrations of the senior author, both those in black and white and the many in full color. The reader of the SURGEON will recognize some of these pictures, as well as the substance of more than one chapter.

While of course every laryngologist must now have this book, other doctors, if they do not own it, must have access to it.

COLLECTED PAPERS OF THE MAYO CLINIC AND THE MAYO FOUNDATION. Edited by RICHARD M. HEWITT, M. A., M. D.; LLOYD G. POTTER, and A. B. NEVLING, M. D. Volume 28. 1,331 pages with 212 illustrations. Price, $12. Philadelphia and London: W. B. Saunders Company, 1937.

The cry is often heard that too much is published in the medical press of today, and there is a good deal of justification for this lament. The new Mayo Clinic volume includes 90 papers in full and 131 in shortened form; 502 are merely listed by title. If the same ratio were applied to all medical publications

(and the literary output of the Mayo Clinic is not below the average for the country at large), keeping abreast of medical literature would be a possibility and not a great deal would be lost.

The current Mayo volume then is well worth while. One is impressed with the amount of space devoted to physiology, particularly that of the stomach and liver. It would appear that gross anatomy has been completed, that little more is to be added to the present knowledge of surgical technic or of pathologic anatomy. The great advances that are being made in our profession today are along the lines of physiology and pathologic physiology, involving biochemistry and endocrinology. The fundamental studies of physiology by Mann and Bollman and the application of these principles by Snell are admirable. Physiology, however, is often perverted by psychiatric disturbances: Alvarez contributes two characteristic papers packed with his common sense ideas along this line.

The enthusiasm for transurethral resection of the prostate has not abated.

There are several excellent papers on obstetrics from one of which a few lines must be quoted. "Too many women ask: 'Will I have something given to me so that I will not know anything about the labor pains?' It seems to me that the question should be: 'Will the labor be so conducted that my infant and myself will have everything done to preserve our present and future health?' "

Wilder is represented with thumbnail descriptions of recent advances in medicine. The second case of carcinoma of the islands of Langhans with the extraction of insulin from metastatic nodules is reported.

There are two papers on the surgical treatment of essential hypertension. It seems great conservatism is exercised in the selection of patients for such operations and success does not always attend the efforts. It would seem that the subject is still in the experimental stages.

In the last section Dr. Will Mayo is represented by a tribute to Lord Moynihan, a commencement address at Notre Dame and several informal talks. These rich bits are simply set but they are not among the least of his achievements.

MEDICAL UROLOGY. By IRVIN S. KOLL, B. S., M. D., F. A. C. S., Attending Urologist, Michael Reece Hospital. 431 pages with 92 illustrations and 6 color plates. Price, $5. St. Louis: The C. V. Mosby Company, 1937.

This book was written for the benefit of the general physician and of the medical student. It will form a good foundation for their knowledge of present day urology. It is not, of course, suitable as a work of reference for one who is already skilled in this line. Even the urologist, however, may find it of value in explaining to his patients the pathology of this system.

A large section is devoted to the treatment of gonorrhea which is fitting and proper as most cases of this common disease must from the nature of things still be treated by the man in general practice. Although in an occasional detail Dr. Koll's teachings are open to argument, widespread use of this book would vastly improve the treatment of gonorrhea.

Study of other sections should enable many other patients to be referred to a skilled urologist in time to receive the maximum benefit.

DR. BODO OTTO AND THE MEDICAL BACKGROUND OF THE AMERICAN REVOLUTION. By JAMES E. GIBSON. 345 pages. Price, $4. Springfield and Baltimore: Charles C Thomas, 1937.

Like most of us, the reviewer had never heard of Dr. Bodo Otto before, but he enjoyed the biography of this physician who came over from Germany shortly before the Revolution. The greater part of the book however deals with the "Medical Background."

No one today can appreciate what smallpox meant before the days of Jenner. It is appalling to see how many of the soldiers of the Revolution were killed by this disease: we may be reminded that the price of the control of smallpox is eternal vigilance. "Putrid fever" also took a heavy toll: it must have taken more courage for an American soldier to enter a hospital than to face the British. Once in a hospital however his chief solace must have been in the amount of wine thought necessary in his treatment.

Those of us who sometimes chafed under the chaos of organizing an Army in 1917 will realize that our troubles were negligible in comparison with those of the Revolutionary Fathers.

Much space is devoted to the squabbles of Dr. John Morgan, Dr. William Shippen, Jr., and Dr. Benjamin Rush, of the Revolutionary Army. Many original documents, some hitherto unpublished, are reproduced. The vindictiveness of Morgan and Rush against Shippen is appalling. Thank God, physicians today, even when they waste no love on each other, do not resort to public villification.

The book is well worth reading by those who are interested in colonial medicine, military medicine and early Americana.

SURGICAL ANATOMY. By GRANT MASSIE, M. B., M. S. (London), F. R. C. S. (Eng.), Assistant Surgeon, Guy's Hospital; Lecturer in Operative Surgery, Guy's Hospital Medical School, London. Third edition. 468 pages with 153 illustrations, many in color. Price, $6.50. Philadelphia: Lea & Febiger, 1937.

The English pride themselves on their common sense, their simplicity and practicalness to such an extent that they consider these virtues typically British. These virtues have indeed long characterized British medicine. Dr. Massie's Surgical Anatomy is a good exemplification of them. The book is well though simply illustrated and the text is easy to read. It is particularly recommended to senior medical students and interns.

FISCHERISMS, being a sheaf of sundry and divers utterances culled from the lectures of MARTIN H. FISCHER, Professor of Physiology in the University of Cincinnati. By HOWARD FABING. A second and enlarged edition by KAY MARR. A private print for his students. 47 pages. Price, $1.50. Springfield and Baltimore: Charles C Thomas, 1937.

Saint Paul cautioned all good Christians not to think of themselves more highly than they ought to think. Some members of our profession violate this fundamental maxim and to such this charming little volume is recommended for the good of their souls. Others will enjoy it unrestrainedly.

PHYSICAL DIAGNOSIS. By RALPH H. MAJOR, M. D., Professor of Medicine in the University of Kansas. 457 pages with 427 illustrations. Price, $5. Philadelphia and London: W. B. Saunders Company, 1937.

One would not have thought it possible to write a book on as hackneyed a subject as physical diagnosis from a fresh and original point of view and to produce a book that is (what every book should be) readable. And yet Dr. Major has done this very thing.

Without boring one with a display of erudition, he introduces a few lines from the original works describing points of importance in physical diagnosis, and the simplicity of the old masters serves to emphasize the freshness of the living art of physical diagnosis.

He does what every author should do, he sticks to his text. He does not give an extended discussion of electrocardiography,—he does not even reproduce a single x-ray!

This book should help restore physical diagnosis to its place of importance and dignity, and should also remind those more experienced that, in spite of all the ingenious mechanical gadgets and clever laboratory tests, physical examination is still by far the most valuable single aid in arriving at the diagnosis. The book should interest and inspire young and old.

SYNOPSIS OF PEDIATRICS. By JOHN ZAHORSKY, A. B., M. D., F. A. C. P., Professor of Pediatrics and Director of the Department of Pediatrics, St. Louis University School of Medicine, etc., assisted by T. S. ZAHORSKY, B. S., M. D., Instructor in Pediatrics, St. Louis University School of Medicine, etc. Second Edition. 367 pages with 80 illustrations and 9 color plates. Price, $4. St. Louis: The C. V. Mosby Company, 1937.

The Mosby Company is doing a good work in putting out economical pocket-sized textbooks. This one on pediatrics is designed to serve as a basis for a 60 hour lecture course. It is well illustrated and the color plates are particularly to be commended. The section on tuberculosis is excellent. Of course certain subjects cannot be taken up fully in a book of this size and the lecturer may feel called upon to disagree with certain details. However the book adequately meets the purpose for which it was planned.

OPHTHALMOSCOPY, RETINOSCOPY, AND REFRACTION with new chapter on ORTHOPTICS. By W. A. FISHER, M. D., F. A. C. S. Fourth Edition. Price, $2, 210 pages with 240 illustrations, including 24 colored plates. Chicago: H. G. Adair Printing Co., 1937.

Dr. Fisher's book on this subject has always been an excellent elementary treatise. The addition of a new chapter on orthoptics increases its value.

SENILE CATARACT, *Methods of Operating*. By W. A. FISHER, M. D., F. A. C. S. Third Edition. Price, $2.50, with 181 illustrations. Chicago: H. G. Adair Printing Co., 1937.

This third edition of Dr. Fisher's book discusses the numerous methods of intracapsular extraction of cataracts. Chapters 6, 7, and 9 are especially satisfactory for inexperienced operators who wish to obtain good technic without sacrificing human eyes.